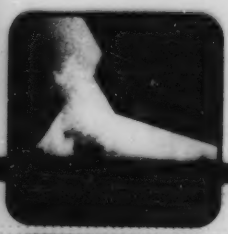
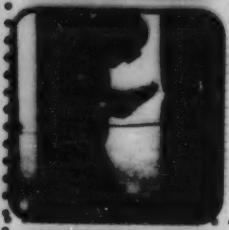
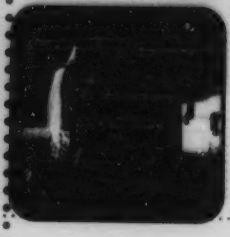
# End-Use Energy Data Handbook 1990 to 2000

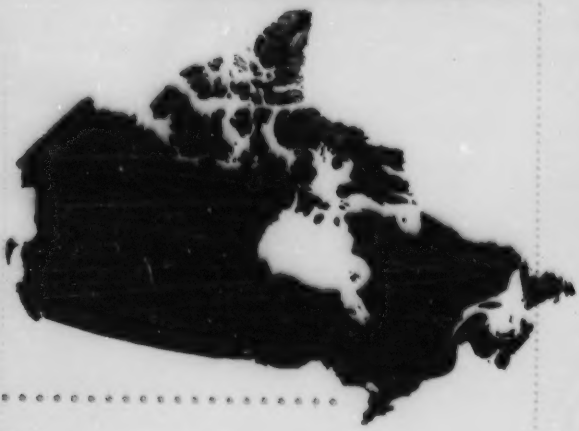
*June 2002*







CANADA'S NATURAL RESOURCES: NOW AND FOR THE FUTURE



Handbook 1990–2000

Natural Resources Canada
Ressources naturelles Canada
Canada

End-Use Energy Data Handbook 1990 to 2000

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# Preface

This is the first edition of the *End-Use Energy Data Handbook 1990 to 2000*. The mandate of the Office of Energy Efficiency (OEE) of Natural Resources Canada is to renew, strengthen and expand Canada's commitment to energy efficiency; therefore, this handbook fulfils part of this mandate.

The main objective of this handbook is to provide an overview of Canada's sectoral end-use energy markets. For further analysis of the data contained in this publication, refer to the handbook's companion document entitled ***Energy Efficiency Trends in Canada 1990 to 2000***.

The *End-Use Energy Data Handbook 1990 to 2000* covers the five sectors that the OEE analyses — i.e., the residential, commercial/institutional, industrial, transportation and agriculture sectors — at a rather aggregate level. The period 1990 to 2000 was chosen because 1990 is the reference year for the Kyoto Protocol, and 2000 is the most recent year for which actual data is available.

This handbook provides data on energy and greenhouse gas (GHG) emissions, as well as activity information and relevant indicators. Such data form the foundation for OEE analysis and of publications such as *Energy Efficiency Trends in Canada 1990 to 2000*. The latter assesses the influence of several factors over changes in energy use by sector (and the related changes in GHGs) over the last decade.

You can access a comprehensive database, including most of the historical energy use and GHG emissions data used by the OEE for its analysis, at the following Web site:
*http://oee.nrcan.gc.ca/neud/dpa/data_e/databases.cfm*.

If you require more information on this publication or the services that the OEE offers, contact us by e-mail at *euc.cec@nrcan.gc.ca*.

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# Contents

**Preface** ..... i

**Chapter 1 – Economy Wide** ..... 1
Canada's Energy Use by Sector, End-Use and Sub-Sector ..... 2
Canada's GHG Emissions – Including Electricity-Related Emissions by Sector, End-Use and Sub-Sector ..... 6
Canada's GHG Emissions – Excluding Electricity-Related Emissions by Sector, End-Use and Sub-Sector ..... 10

**Chapter 2 – Residential Sector** ..... 15
The Data Situation ..... 15
Residential Energy Use by Fuel Type and End-Use ..... 18
Residential GHG Emissions by Fuel Type and End-Use ..... 20
Residential Housing Stock and Floor Space ..... 22
Residential Lighting and Space Cooling Details ..... 24
Residential Appliances Details ..... 26
Residential Space Heating Energy Use and System Stock Share ..... 30
Residential Water Heating Energy Use and Water Heater Stock Share ..... 32

**Chapter 3 – Commercial/Institutional Sector** ..... 35
The Data Situation ..... 35
Commercial Energy Use by Fuel Type, End-Use and Building Type ..... 38
Commercial Energy Use by Building Type and Fuel Type ..... 42
Commercial GHG Emissions by Fuel Type, End-Use and Building Type ..... 48

**Chapter 4 - Industrial Sector** ..... **53**
The Data Situation ..... 53
Industrial Energy Use and GHG Emissions by Fuel Type ..... 56
Industrial Energy Use by Industry ..... 58
Industrial GHG Emissions by Industry – Including Electricity-Related Emissions ..... 62
Industrial GHG Emissions by Industry – Excluding Electricity-Related Emissions ..... 66
Industrial Activity Index by Industry ..... 70

**Chapter 5 - Transportation Sector** ..... **75**
The Data Situation ..... 75
Transportation Energy Use by Fuel Type and Transportation Mode ..... 76
Transportation GHG Emissions by Fuel Type and Transportation Mode ..... 78
Passenger Transportation Energy Use by Fuel Type and Transportation Mode ..... 80
Passenger Transportation GHG Emissions by Fuel Type and Transportation Mode ..... 82
Freight Transportation Energy Use by Fuel Type and Transportation Mode ..... 84
Freight Transportation GHG Emissions by Fuel Type and Transportation Mode ..... 86
Passenger and Freight Road Transportation Energy Use and GHG Emissions by Fuel Type ..... 88
Transportation Explanatory Variables ..... 90

**Chapter 6 - Agriculture Sector** ..... **95**
The Data Situation ..... 95
Agriculture Energy Use and GHG Emissions by Fuel Type and End-Use ..... 96

**Appendix A – Reconciliation of Data on Energy Use Found in This Report With Data in Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada — 2000*** .... 98

**Appendix B – Reconciliation of Definition of Estimated Greenhouse Gas Emissions Found in This Report With Environment Canada's *Canada's Greenhouse Gas Inventory: 1990–1999*** ..... 101

**Appendix C – Glossary of Terms** ..... 105

# Chapter 1 Economy Wide

The aggregate energy use data presented in this report are based on *Statistics Canada's Quarterly Report on Energy Supply-Demand in Canada* (QRESD) (Cat. No. 57-003). The QRESD is Canada's official energy supply and demand balance in Canada. With regards to the greenhouse gases, particularly the data on carbon dioxide, they are estimated using emissions factors developed by Environment Canada.

The *Office of Energy Efficiency* (OEE) developed energy models for each sector of the economy that are presented in this report – i.e., the residential, commercial/institutional, industrial, transportation and agriculture – to assess trends in energy use in the Canadian economy.

The OEE is continually improving the quality of information used to understand the evolution of energy use in Canada.

## Canada's Energy Use by Sector, End-Use and Sub-Sector (petajoules)

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Residential** [a,b] | **1,299.6** | **1,277.9** | **1,367.3** | **1,358.1** | **1,385.7** |
| Space Heating | 784.7 | 770.2 | 801.3 | 837.1 | 849.8 |
| Water Heating | 279.4 | 275.6 | 276.9 | 283.5 | 295.3 |
| Space Cooling | 6.9 | 9.5 | 3.5 | 7.0 | 7.2 |
| Appliances | 176.8 | 171.1 | 173.0 | 176.6 | 179.6 |
| *Major Appliances* | *129.2* | *125.1* | *125.2* | *122.0* | *122.3* |
| *Other* | *47.6* | *46.0* | *47.7* | *54.6* | *57.4* |
| Lighting | 52.0 | 51.4 | 52.7 | 52.0 | 53.9 |
| **Commercial** [a,c,d] | **867.8** | **888.9** | **901.2** | **933.1** | **927.8** |
| Space Heating | 428.1 | 434.4 | 465.6 | 482.0 | 469.4 |
| Water Heating | 93.3 | 94.5 | 94.3 | 95.5 | 96.2 |
| Space Cooling | 39.8 | 49.8 | 29.1 | 40.4 | 44.1 |
| Auxiliary Equipment | 65.5 | 67.3 | 67.2 | 67.8 | 68.6 |
| Auxiliary Motors | 103.8 | 105.2 | 106.2 | 107.3 | 108 |
| Lighting | 127.4 | 129.0 | 130.3 | 131.8 | 133.2 |
| Street Lighting | 8.9 | 8.7 | 8.4 | 8.3 | 8.0 |
| **Industrial** [a] | **2,754.7** | **2,701.0** | **2,723.0** | **2,748.0** | **2,911.5** |
| Mining | 343.4 | 327.1 | 338.6 | 406.8 | 415.8 |
| Pulp and Paper | 784.7 | 779.2 | 780.1 | 782.7 | 866.1 |
| Iron and Steel | 219.4 | 235.0 | 244.9 | 241.9 | 250.3 |
| Smelting and Refining | 183.3 | 188.4 | 198.0 | 210.8 | 222.7 |
| Cement | 59.3 | 50.8 | 50.8 | 51.1 | 59.2 |
| Chemicals | 223.2 | 232.6 | 222.5 | 211.2 | 242.1 |
| Petroleum Refining | 334.9 | 314.0 | 321.5 | 325.0 | 317.3 |
| Other Manufacturing | 531.8 | 509.5 | 501.5 | 460.0 | 476.5 |
| Forestry | 7.7 | 6.5 | 7.4 | 7.9 | 7.5 |
| Construction | 66.9 | 57.9 | 57.6 | 50.7 | 54.0 |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001 (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.
d) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.
e) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
f) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.
g) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.
h) Transport Canada, Surface and Marine Statistics and Forecasts Division, December 1999. Data for 2000 estimated by Natural Resources Canada.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990-2000 |
|---|---|---|---|---|---|---|
| **1,354.7** | **1,451.1** | **1,484.5** | **1,272.7** | **1,323.3** | **1,388.1** | **6.8%** |
| 824.3 | 904.5 | 860.4 | 729.8 | 769.8 | 830.7 | 5.9% |
| 290.7 | 302.5 | 299.0 | 293.8 | 298.1 | 302.4 | 8.2% |
| 9.4 | 7.9 | 7.6 | 11.8 | 13.0 | 8.6 | 24.6% |
| 176.6 | 180.6 | 181.7 | 180.5 | 183.7 | 186.0 | 5.2% |
| *118.6* | *120.1* | *119.1* | *116.6* | *116.7* | *116.5* | *-9.8%* |
| *58.0* | *60.6* | *62.6* | *63.9* | *66.9* | *69.6* | *46.2%* |
| 53.7 | 55.6 | 55.9 | 56.7 | 58.7 | 60.3 | 16.0% |
| | | | | | | |
| **960.9** | **981.5** | **996.5** | **944.1** | **979.2** | **1,058.8** | **22.1%** |
| 499.6 | 522.5 | 532.9 | 455.3 | 481.0 | 550.8 | 28.7% |
| 96.2 | 96.2 | 97.1 | 97.9 | 99.3 | 104.1 | 11.6% |
| 47.5 | 44.7 | 44.4 | 61.0 | 62.3 | 46.1 | 15.8% |
| 68.4 | 68.4 | 70.2 | 71.4 | 73.5 | 78.5 | 19.8% |
| 108.3 | 108.5 | 110 | 112 | 114 | 120.8 | 16.4% |
| 133.3 | 133.7 | 136.4 | 139.0 | 141.7 | 151.2 | 18.7% |
| 7.8 | 7.5 | 7.4 | 7.5 | 7.4 | 7.3 | -18.0% |
| | | | | | | |
| **2,973.6** | **3,057.5** | **3,057.2** | **3,004.6** | **3,066.5** | **3,203.5** | **16.3%** |
| 443.7 | 472.7 | 474.2 | 455.1 | 458.3 | 490.3 | 42.8% |
| 871.4 | 874.4 | 882.8 | 884.2 | 958.9 | 961.2 | 22.5% |
| 247.9 | 252.1 | 251.2 | 254.7 | 259.8 | 257.7 | 17.5% |
| 219.9 | 233.3 | 231.0 | 239.7 | 236.4 | 226.1 | 23.3% |
| 61.3 | 58.5 | 57.9 | 63.6 | 66.8 | 66.5 | 12.1% |
| 253.1 | 255.3 | 245.9 | 241.2 | 240.4 | 239.4 | 7.3% |
| 308.4 | 329.5 | 320.9 | 294.6 | 289.3 | 296.6 | -11.4% |
| 510.9 | 521.6 | 532.8 | 510.4 | 523.5 | 599.6 | 12.7% |
| 7.9 | 9.6 | 11.1 | 12.3 | 14.8 | 16.2 | 110.4% |
| 48.9 | 50.5 | 49.5 | 48.0 | 50.4 | 49.9 | -25.4% |

*continued*

## Canada's Energy Use by Sector, End-Use and Sub-Sector (petajoules) *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Transportation** [a] | **1,877.9** | **1,907.3** | **1,858.1** | **1,873.2** | **1,967.8** |
| ***Passenger Transportation*** [a,c,f,g] | ***1,149.8*** | ***1,094.9*** | ***1,125.2*** | ***1,143.6*** | ***1,193.8*** |
| Cars | 680.4 | 659.2 | 660.6 | 660.3 | 659.9 |
| Light Trucks | 216.5 | 206.3 | 225.5 | 250.7 | 284.4 |
| Motorcycles | 1.7 | 1.6 | 1.7 | 1.8 | 2.0 |
| Bus | 57.9 | 57.0 | 61.6 | 61.9 | 70.1 |
| Rail | 5.1 | 3.3 | 3.2 | 3.4 | 2.9 |
| Air | 187.4 | 167.5 | 172.8 | 165.4 | 174.5 |
| ***Freight Transportation*** [a,f,g,h] | ***675.3*** | ***655.9*** | ***666.3*** | ***669.9*** | ***713.6*** |
| Light Trucks | 134.9 | 139.0 | 144.8 | 140.1 | 137.5 |
| Medium Trucks | 101.3 | 98.4 | 103.4 | 107.5 | 114.9 |
| Heavy Trucks | 248.2 | 228.3 | 225.0 | 242.5 | 270.9 |
| Rail | 84.4 | 79.6 | 83.5 | 83.0 | 86.4 |
| Marine | 106.5 | 110.6 | 109.7 | 96.8 | 103.9 |
| ***Off-Road*** [d] | ***53.6*** | ***56.5*** | ***58.6*** | ***59.7*** | ***60.4*** |
| **Agriculture** [e] | **199.2** | **195.2** | **198.9** | **198.8** | **195.8** |
| **Total Energy Use** | **6,998.6** | **6,870.3** | **6,978.5** | **7,189.2** | **7,388.4** |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001 (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.
d) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.
e) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
f) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.
g) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.
h) Transport Canada, Surface and Marine Statistics and Forecasts Division, December 1999. Data for 2000 estimated by Natural Resources Canada.

*continued*

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| 2,004.9 | 2,043.0 | 2,117.2 | 2,194.5 | 2,252.8 | 2,282.1 | 21.8% |
| | | | | | | |
| *1,207.8* | *1,226.4* | *1,245.2* | *1,265.1* | *1,301.1* | *1,294.3* | *12.8%* |
| 638.1 | 623.7 | 614.5 | 603.7 | 595.8 | 575.8 | -15.4% |
| 304.9 | 320.1 | 341.3 | 377.7 | 394.5 | 401.0 | 85.2% |
| 1.8 | 1.8 | 1.9 | 2.0 | 2.1 | 2.3 | 35.3% |
| 73.3 | 68.8 | 70.5 | 72.9 | 68.6 | 73.2 | 26.4% |
| 2.4 | 2.5 | 2.3 | 2.2 | 2.5 | 2.5 | -51.0% |
| 187.3 | 209.4 | 214.6 | 226.7 | 237.5 | 239.5 | 27.8% |
| | | | | | | |
| *734.7* | *752.9* | *805.1* | *839.3* | *876.3* | *905.5* | *34.1%* |
| 136.4 | 141.9 | 148.2 | 161.4 | 165.6 | 163.8 | 21.4% |
| 119.8 | 126.0 | 135.0 | 136.6 | 149.7 | 158.1 | 56.1% |
| 298.3 | 308.5 | 344.0 | 347.8 | 371.0 | 389.0 | 56.7% |
| 78.5 | 76.6 | 77.9 | 74.4 | 78.6 | 80.5 | -4.6% |
| 101.7 | 99.9 | 100.1 | 119.2 | 111.5 | 114.0 | 7.0% |
| | | | | | | |
| *82.4* | *83.7* | *86.9* | *78.1* | *75.5* | *82.3* | *53.5%* |
| | | | | | | |
| *299.2* | *222.9* | *230.0* | *224.7* | *229.9* | *231.9* | *16.4%* |
| | | | | | | |
| *7,503.3* | *7,758.0* | *7,887.4* | *7,640.0* | *7,883.7* | *8,184.4* | *16.7%* |

## Canada's GHG Emissions — Including Electricity-Related Emissions by Sector, End-Use and Sub-Sector (megatonnes)

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Residential** [a,b,i] | **69.6** | **66.9** | **71.9** | **68.9** | **69.1** |
| Space Heating | 41.3 | 39.8 | 42.6 | 42.6 | 42.5 |
| Water Heating | 15.2 | 14.6 | 15.4 | 14.5 | 14.9 |
| Space Cooling | 0.4 | 0.5 | 0.2 | 0.3 | 0.3 |
| Appliances | 9.9 | 9.2 | 10.5 | 8.8 | 8.7 |
| *Major Appliances* | *7.2* | *6.8* | *7.6* | *6.1* | *5.8* |
| *Other* | *2.7* | *2.5* | *2.9* | *2.7* | *2.8* |
| Lighting | 2.9 | 2.8 | 3.2 | 2.6 | 2.6 |
| **Commercial** [a,c,d,i] | **47.8** | **47.9** | **51.2** | **48.5** | **47.4** |
| Space Heating | 23.4 | 23.5 | 25.5 | 25.6 | 24.7 |
| Water Heating | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Space Cooling | 2.2 | 2.7 | 1.7 | 2.0 | 2.1 |
| Auxiliary Equipment | 3.7 | 3.7 | 4.0 | 3.5 | 3.4 |
| Auxiliary Motors | 5.8 | 5.7 | 6.4 | 5.4 | 5.3 |
| Lighting | 7.1 | 6.9 | 7.9 | 6.6 | 6.5 |
| Street Lighting | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| **Industrial** [a,i] | **141.1** | **136.0** | **141.2** | **135.5** | **138.1** |
| Mining | 21.2 | 20.1 | 21.3 | 23.7 | 24.3 |
| Pulp and Paper | 24.1 | 23.2 | 23.4 | 21.7 | 21.5 |
| Iron and Steel | 15.9 | 17.0 | 17.7 | 17.0 | 17.2 |
| Smelting and Refining | 10.7 | 10.6 | 12.3 | 11.1 | 11.6 |
| Cement | 4.2 | 3.6 | 3.6 | 3.5 | 4.0 |
| Chemicals | 10.8 | 10.9 | 11.2 | 10.3 | 11.5 |
| Petroleum Refining | 20.7 | 19.5 | 20.1 | 20.3 | 19.5 |
| Other Manufacturing | 28.5 | 26.9 | 27.4 | 24.0 | 24.4 |
| Forestry | 0.6 | 0.5 | 0.6 | 0.6 | 0.6 |
| Construction | 4.4 | 3.8 | 3.7 | 3.3 | 3.5 |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001 (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.

c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.

d) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.

e) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*. February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).

f) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.

g) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.

h) Transport Canada, Surface and Marine Statistics and Forecast Division, December 1999. Data for 2000 estimated by Natural Resources Canada.

i) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1998*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1989-2000 |
|---|---|---|---|---|---|---|
| **68.5** | **73.0** | **72.4** | **69.2** | **70.7** | **74.7** | **7.3%** |
| 41.4 | 45.7 | 43.4 | 37.6 | 39.6 | 42.6 | 3.6% |
| 14.9 | 15.3 | 15.7 | 16.2 | 16.1 | 16.6 | 9.2% |
| 0.5 | 0.4 | 0.4 | 0.7 | 0.8 | 0.5 | 25.0% |
| 8.9 | 8.8 | 9.8 | 11.0 | 10.8 | 11.2 | 13.1% |
| *6.0* | *5.9* | *6.4* | *7.0* | *6.8* | *6.9* | *-4.2%* |
| *2.9* | *3.0* | *3.4* | *3.9* | *3.9* | *4.2* | *55.6%* |
| 2.7 | 2.7 | 3.0 | 3.5 | 3.5 | 3.6 | 24.1% |
| | | | | | | |
| **50.4** | **50.5** | **53.8** | **53.9** | **54.8** | **59.9** | **25.3%** |
| 26.7 | 27.7 | 28.6 | 24.8 | 26.0 | 30.1 | 28.6% |
| 5.1 | 5.0 | 5.1 | 5.2 | 5.2 | 5.6 | 12.0% |
| 2.4 | 2.2 | 2.4 | 3.7 | 3.6 | 2.7 | 22.7% |
| 3.5 | 3.4 | 3.9 | 4.4 | 4.3 | 4.7 | 27.0% |
| 5.5 | 5.3 | 6.0 | 6.9 | 6.7 | 7.3 | 25.9% |
| 6.7 | 6.5 | 7.4 | 8.5 | 8.3 | 9.1 | 28.2% |
| 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | -20.0% |
| | | | | | | |
| **143.2** | **146.8** | **150.8** | **152.3** | **152.1** | **159.3** | **12.9%** |
| 26.3 | 27.7 | 28.5 | 28.3 | 28.2 | 30.3 | 42.9% |
| 22.1 | 22.1 | 23.5 | 23.7 | 24.1 | 24.6 | 2.1% |
| 17.2 | 17.3 | 17.3 | 17.7 | 18.1 | 18.0 | 13.2% |
| 11.8 | 12.2 | 13.0 | 14.8 | 14.1 | 13.7 | 28.0% |
| 4.1 | 3.9 | 4.0 | 4.2 | 4.4 | 4.3 | 2.4% |
| 12.0 | 12.1 | 12.4 | 12.7 | 12.6 | 12.6 | 16.7% |
| 19.4 | 20.6 | 20.1 | 19.2 | 18.3 | 18.9 | -8.7% |
| 26.5 | 26.8 | 27.9 | 27.6 | 27.9 | 32.3 | 13.3% |
| 0.6 | 0.7 | 0.8 | 0.9 | 1.1 | 1.2 | 100.0% |
| 3.3 | 3.3 | 3.3 | 3.2 | 3.3 | 3.3 | -25.0% |

*continued*

## Canada's GHG Emissions — Including Electricity-Related Emissions by Sector, End-Use and Sub-Sector (megatonnes) *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Transportation** [a,j] | **126.9** | **129.8** | **132.9** | **134.8** | **141.5** |
| ***Passenger Transportation*** [a,b,g,j] | ***81.9*** | ***77.9*** | ***80.1*** | ***81.5*** | ***85.1*** |
| Cars | 48.1 | 46.6 | 46.7 | 46.7 | 46.7 |
| Light Trucks | 15.7 | 14.9 | 16.3 | 18.1 | 20.6 |
| Motorcycles | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Bus | 4.0 | 4.0 | 4.3 | 4.3 | 4.9 |
| Rail | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 |
| Air | 13.6 | 12.1 | 12.5 | 12.0 | 12.6 |
| ***Freight Transportation*** [a,f,g,j] | ***40.4*** | ***47.9*** | ***48.7*** | ***48.9*** | ***52.1*** |
| Light Trucks | 9.5 | 9.8 | 10.2 | 9.9 | 9.7 |
| Medium Trucks | 7.3 | 7.1 | 7.5 | 7.8 | 8.3 |
| Heavy Trucks | 17.7 | 16.3 | 16.0 | 17.3 | 19.3 |
| Rail | 6.7 | 6.3 | 6.6 | 6.6 | 6.9 |
| Marine | 8.1 | 8.4 | 8.4 | 7.4 | 7.9 |
| ***Off-Road*** [a,j] | ***3.8*** | ***4.8*** | ***4.1*** | ***4.2*** | ***4.2*** |
| **Agriculture** [a,j] | **13.7** | **13.3** | **13.8** | **13.3** | **13.3** |
| **Total GHG Emissions** | **467.2** | **383.9** | **419.8** | **488.8** | **499.4** |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001 (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.
d) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.
e) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*. February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
f) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.
g) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.
h) Transport Canada, Surface and Marine Statistics and Forecast Division, December 1999. Data for 2000 estimated by Natural Resources Canada.
i) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | continued<br>Total Growth 1990-2000 |
|---|---|---|---|---|---|---|
| 144.1 | 148.8 | 152.2 | 156.9 | 161.1 | 163.4 | 21.8% |
| | | | | | | |
| *86.1* | *87.8* | *88.9* | *89.7* | *91.9* | *91.8* | 11.7% |
| 45.1 | 44.1 | 43.4 | 42.3 | 41.8 | 40.4 | -18.0% |
| 22.0 | 23.1 | 24.7 | 27.1 | 28.3 | 28.7 | 82.8% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 100.0% |
| 5.1 | 4.8 | 4.9 | 5.1 | 4.8 | 5.2 | 30.0% |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | -50.0% |
| 13.5 | 15.1 | 15.5 | 15.9 | 16.7 | 16.8 | 23.5% |
| | | | | | | |
| *83.6* | *84.8* | *88.6* | *91.2* | *94.9* | *98.1* | 32.8% |
| 9.6 | 10.0 | 10.5 | 11.4 | 11.7 | 11.6 | 22.1% |
| 8.8 | 9.1 | 9.7 | 9.8 | 10.8 | 11.4 | 56.2% |
| 21.3 | 22.0 | 24.5 | 25.0 | 26.7 | 28.0 | 58.2% |
| 6.2 | 6.1 | 6.2 | 6.0 | 6.3 | 6.5 | -3.0% |
| 7.8 | 7.6 | 7.7 | 9.0 | 8.5 | 8.6 | 8.2% |
| | | | | | | |
| *4.4* | *4.5* | *4.7* | *4.9* | *5.3* | *5.7* | 88.9% |
| | | | | | | |
| 14.4 | 15.2 | 15.9 | 15.9 | 16.2 | 16.4 | 19.7% |
| | | | | | | |
| 429.6 | 432.3 | 445.1 | 448.2 | 464.7 | 473.7 | 16.3% |

## Canada's GHG Emissions — Excluding Electricity-Related Emissions by Sector, End-Use and Sub-Sector (megatonnes)

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Residential** [a,b,i] | **43.4** | **41.8** | **43.0** | **46.1** | **46.8** |
| Space Heating | 34.4 | 32.9 | 34.0 | 35.6 | 35.9 |
| Water Heating | 8.8 | 8.7 | 8.7 | 9.2 | 9.8 |
| Space Cooling | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Appliances | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| *Major Appliances* | *0.2* | *0.2* | *0.2* | *0.2* | *0.2* |
| *Other* | *0.0* | *0.0* | *0.0* | *0.0* | *0.0* |
| Lighting | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Commercial** [c,e,f,i] | **25.5** | **25.8** | **27.1** | **29.1** | **27.5** |
| Space Heating | 20.5 | 20.8 | 21.6 | 22.6 | 21.9 |
| Water Heating | 4.7 | 4.8 | 4.7 | 4.8 | 4.8 |
| Space Cooling | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 |
| Auxiliary Equipment | 0.6 | 0.8 | 0.7 | 0.6 | 0.6 |
| Auxiliary Motors | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lighting | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Street Lighting | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Industrial** [d,i] | **104.2** | **100.1** | **100.8** | **108.8** | **103.4** |
| Mining | 15.4 | 14.6 | 15.1 | 18.5 | 19.3 |
| Pulp and Paper | 14.2 | 13.5 | 12.5 | 12.4 | 12.2 |
| Iron and Steel | 14.2 | 15.5 | 15.9 | 15.5 | 15.7 |
| Smelting and Refining | 3.3 | 2.6 | 2.9 | 2.7 | 3.3 |
| Cement | 3.8 | 3.3 | 3.3 | 3.2 | 3.6 |
| Chemicals | 7.1 | 7.5 | 7.5 | 7.3 | 8.6 |
| Petroleum Refining | 19.6 | 18.4 | 18.8 | 19.2 | 18.4 |
| Other Manufacturing | 21.6 | 20.5 | 20.1 | 18.0 | 18.3 |
| Forestry | 0.6 | 0.5 | 0.6 | 0.6 | 0.6 |
| Construction | 4.4 | 3.8 | 3.7 | 3.3 | 3.5 |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001 (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.

c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.

d) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1998*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.

e) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).

f) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.

g) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.

h) Transport Canada, Surface and Marine Statistics and Forecast Division, December 1999. Data for 2000 estimated by Natural Resources Canada.

i) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| | | | | | | |
|---|---|---|---|---|---|---|
| **44.5** | **46.2** | **46.2** | **46.6** | **42.5** | **44.7** | **0.5%** |
| 34.7 | 38.8 | 35.9 | 30.4 | 32.2 | 34.2 | -0.5% |
| 9.6 | 10.2 | 10.1 | 10.0 | 10.1 | 10.2 | 15.9% |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | - |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.0% |
| *0.2* | *0.3* | *0.3* | *0.3* | *0.3* | *0.2* | 0.0% |
| *0.0* | *0.0* | *0.0* | *0.0* | *0.0* | *0.0* | - |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | - |
| **29.8** | **29.7** | **30.1** | **27.4** | **28.9** | **32.8** | **28.9%** |
| 23.3 | 24.0 | 24.3 | 21.5 | 22.9 | 26.3 | 26.3% |
| 4.8 | 4.8 | 4.8 | 4.9 | 4.9 | 5.2 | 10.8% |
| 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.4 | 300.0% |
| 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 16.7% |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | - |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | - |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | - |
| **108.8** | **118.4** | **109.7** | **105.1** | **105.9** | **118.4** | **8.8%** |
| 20.6 | 22.0 | 22.1 | 20.8 | 21.4 | 23.0 | 49.4% |
| 11.9 | 12.4 | 12.4 | 11.4 | 11.4 | 11.2 | -21.1% |
| 15.6 | 15.7 | 15.5 | 15.5 | 15.9 | 15.8 | 11.3% |
| 3.1 | 3.5 | 3.3 | 3.6 | 3.3 | 2.8 | -15.2% |
| 3.8 | 3.6 | 3.6 | 3.7 | 4.0 | 3.9 | 2.6% |
| 8.5 | 8.8 | 8.9 | 8.6 | 8.5 | 8.3 | 18.0% |
| 18.5 | 19.7 | 19.1 | 18.1 | 17.2 | 17.8 | -9.2% |
| 20.0 | 20.5 | 20.7 | 19.3 | 19.9 | 23.1 | 8.9% |
| 0.6 | 0.7 | 0.8 | 0.9 | 1.1 | 1.2 | 100.0% |
| 3.3 | 3.3 | 3.3 | 3.2 | 3.3 | 3.3 | -25.0% |

## Canada's GHG Emissions — Excluding Electricity-Related Emissions by Sector, End-Use and Sub-Sector (megatonnes) *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Transportation** [a,i] | **134.8** | **129.7** | **132.7** | **134.8** | **141.3** |
| ***Passenger Transportation*** [a,e,f,g,i] | ***81.7*** | ***77.8*** | ***79.9*** | ***81.3*** | ***84.9*** |
| Cars | 48.1 | 45.6 | 46.7 | 46.7 | 46.7 |
| Light Trucks | 15.7 | 14.9 | 16.3 | 18.1 | 20.6 |
| Motorcycles | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Bus | 3.9 | 3.8 | 4.1 | 4.1 | 4.7 |
| Rail | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 |
| Air | 13.6 | 12.1 | 12.5 | 12.0 | 12.6 |
| ***Freight Transportation*** [a,f,g,h,i] | ***49.4*** | ***47.9*** | ***48.7*** | ***49*** | ***52.1*** |
| Light Trucks | 9.5 | 9.8 | 10.2 | 9.9 | 9.7 |
| Medium Trucks | 7.3 | 7.1 | 7.5 | 7.8 | 8.3 |
| Heavy Trucks | 17.7 | 16.3 | 16.0 | 17.3 | 19.3 |
| Rail | 6.7 | 6.3 | 6.6 | 6.6 | 6.9 |
| Marine | 8.1 | 8.4 | 8.4 | 7.4 | 7.9 |
| ***Off-Road*** [a,i] | ***3.8*** | ***4*** | ***4.1*** | ***4.2*** | ***4.2*** |
| **Agriculture** [a,i] | **12** | **11.5** | **11.8** | **11.8** | **11.8** |
| **Total GHG Emissions** | **329.3** | **309.6** | **314.8** | **320.1** | **329.6** |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001 (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
b) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.
d) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.
e) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*. February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).
f) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.
g) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.
h) Transport Canada, Surface and Marine Statistics and Forecast Division, December 1999. Data for 2000 estimated by Natural Resources Canada.
i) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| 1996 | 1996 | 1997 | 1998 | 1999 | 2000 | continued<br>Total Growth 1990-2000 |
|---|---|---|---|---|---|---|
| 143.9 | 146.7 | 152 | 156.7 | 161 | 163.2 | 21.1% |
| | | | | | | |
| *89* | *87.3* | *88.7* | *90.6* | *91.7* | *91.3* | *11.6%* |
| 45.1 | 44.1 | 43.5 | 42.3 | 41.8 | 40.4 | -16.0% |
| 22.0 | 23.1 | 24.7 | 27.1 | 28.3 | 28.7 | 82.8% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 100.0% |
| 5.0 | 4.6 | 4.8 | 5.0 | 4.7 | 5.0 | 28.2% |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | -50.0% |
| 13.5 | 15.1 | 15.5 | 15.9 | 16.7 | 16.8 | 23.5% |
| | | | | | | |
| *53.8* | *54.8* | *58.6* | *61.2* | *64* | *66.1* | *23.6%* |
| 9.6 | 10.0 | 10.5 | 11.4 | 11.7 | 11.6 | 22.1% |
| 8.6 | 9.1 | 9.7 | 9.8 | 10.8 | 11.4 | 58.2% |
| 21.3 | 22.0 | 24.5 | 25.0 | 26.7 | 28.0 | 58.2% |
| 6.2 | 6.1 | 6.2 | 6.0 | 6.3 | 6.5 | -3.0% |
| 7.8 | 7.6 | 7.7 | 9.0 | 8.5 | 8.6 | 6.2% |
| | | | | | | |
| *4.4* | *4.5* | *4.7* | *4.9* | *5.3* | *5.7* | *88.6%* |
| | | | | | | |
| 12.8 | 13.5 | 14 | 13.8 | 14.2 | 14.3 | 19.3% |
| | | | | | | |
| 338.6 | 340.5 | 352.8 | 343.6 | 352.5 | 365.2 | 14.9% |

# Chapter 2 Residential Sector

## The Data Situation

Aggregate data on residential energy use are reported on a quarterly basis in Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada* (QRESD) (Cat. No. 57-003). Additional data on the characteristics of residential equipment and housing stock are collected in Statistics Canada's *Survey of Household Spending*, which replaced the previous *Household Facilities and Equipment Survey*.

Natural Resources Canada (NRCan) has also collected additional information through two types of surveys sponsored by the National Energy Use Database (NEUD): stock surveys and flow surveys. Stock surveys have two main goals. First, they aim to collect information on the characteristics of energy-using appliances and equipment, the state of dwellings and the building stock, and the profile of consumers (including consumption habits). Their second goal is to collect data on the annual energy consumption of households. Flow surveys, however, gather information on variables affecting the housing stock, such as the characteristics of new equipment and new housing, and retrofit activities. For more information on the surveys conducted by the NEUD, visit its Web site at: *http://oee.nrcan.gc.ca/neud/dpa/data_e/neud_publications.cfm*.

Furthermore, the Office of Energy Efficiency (OEE) developed the Residential Energy Use Model (REUM). This stock accounting model assesses trends in energy use in the Canadian residential sector. It is disaggregated at the provincial level and includes five end uses (space heating, water heating, appliances, lighting and space cooling).

Using data on the characteristics of the stock of residential buildings and equipment, the REUM allocates the energy use reported by Statistics Canada in its QRESD to five end uses. To estimate the end-use energy use, the model uses annual stock and sales data and couples them with demand loads and unit energy consumption of the equipment stock.

The model estimates the household stock data by building type and vintage, using data found in the *Household Facilities and Equipment Survey* for the pre-1997 period and in the *Survey of Household Spending for 1997* onward. The OEE estimated the floor space data found in the model by using results from those two surveys, as well as the *Building Permits Survey* also conducted by Statistics Canada and from the 1993 and 1997 Survey of Household Energy Use, conducted by Statistics Canada on behalf of NRCan. The data on residential equipment stock comes from Statistics Canada's *Survey of Household Spending*, as well as other industry surveys. The data on demand load and unit energy consumption comes from various studies, some conducted at the request of NRCan.

## Residential Energy Use by Fuel Type and End-Use

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Energy Use (PJ)** [a,d] | **1,299.8** | **1,277.9** | **1,307.3** | **1,356.1** | **1,385.7** |
| ***Energy Use by Fuel Type (PJ)*** [a,d] | | | | | |
| Electricity | 467.4 | 465.8 | 476.0 | 476.7 | 478.4 |
| Natural Gas | 528.4 | 531.8 | 553.3 | 593.5 | 631.5 |
| Heating Oil | 186.4 | 162.3 | 168.5 | 172.5 | 163.0 |
| Wood | 95.8 | 94.8 | 91.1 | 99.5 | 99.0 |
| Propane | 19.9 | 21.2 | 18.4 | 12.1 | 12.3 |
| Coal and Other | 2.0 | 2.0 | 2.0 | 1.8 | 1.5 |
| ***Energy Use by End-Use (PJ)*** [d] | | | | | |
| Space Heating | 784.7 | 770.2 | 801.3 | 837.1 | 849.8 |
| Water Heating | 279.4 | 275.6 | 276.9 | 283.5 | 295.3 |
| Appliances | 176.8 | 171.1 | 173.0 | 176.6 | 179.6 |
| Lighting | 52.0 | 51.4 | 52.7 | 52.0 | 53.9 |
| Space Cooling | 6.9 | 9.5 | 3.5 | 7.0 | 7.2 |
| **Activity** | | | | | |
| Total Floor Space (million m²) [d] | 1,253.5 | 1,300.0 | 1,326.6 | 1,359.4 | 1,393.0 |
| Total Households (thousands) [b,c,d] | 9,966 | 10,255 | 10,437 | 10,633 | 10,793 |
| **Energy Intensity (GJ/m²)** [a,d] | **1.04** | **0.98** | **0.99** | **1.00** | **0.99** |
| **Energy Intensity (GJ/household)** [a,b,c,d] | **130.4** | **124.6** | **125.3** | **127.5** | **128.4** |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Statistics Canada, *Survey of Household Spending in 1997–2000*, Ottawa, October 2001, (Cat. No. 62F0041).

c) Statistics Canada, *Household Facilities and Equipment,1990–1997*, Ottawa, October 1990 – October 1997, (Cat. No. 64-202).

d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| 1,354.7 | 1,451.1 | 1,484.5 | 1,272.7 | 1,323.3 | 1,388.1 | 6.9% |
| | | | | | | |
| 473.8 | 486.9 | 484.2 | 465.6 | 479.8 | 497.6 | 6.5% |
| 630.5 | 696.0 | 648.1 | 577.8 | 609.3 | 644.8 | 22.0% |
| 138.0 | 158.9 | 147.1 | 126.1 | 131.0 | 132.4 | -29.0% |
| 95.5 | 93.0 | 109.4 | 89.2 | 91.0 | 100.3 | 4.7% |
| 14.5 | 14.2 | 13.8 | 12.4 | 10.5 | 11.4 | -42.7% |
| 2.3 | 2.3 | 2.0 | 1.7 | 1.7 | 1.6 | -20.0% |
| | | | | | | |
| 824.3 | 904.5 | 860.4 | 729.8 | 769.8 | 830.7 | 5.9% |
| 290.7 | 302.5 | 299.0 | 293.8 | 298.1 | 302.4 | 8.2% |
| 176.6 | 180.6 | 181.7 | 180.5 | 183.7 | 186.0 | 5.2% |
| 53.7 | 55.6 | 55.9 | 56.7 | 58.7 | 60.3 | 16.0% |
| 9.4 | 7.9 | 7.6 | 11.8 | 13.0 | 8.6 | 24.6% |
| | | | | | | |
| 1,420.1 | 1,433.5 | 1,431.6 | 1,448.4 | 1,458.7 | 1,484.4 | 18.4% |
| 10,977 | 11,148 | 11,224 | 11,385 | 11,553 | 11,728 | 17.7% |
| | | | | | | |
| 0.95 | 1.01 | 0.98 | 0.88 | 0.91 | 0.94 | -9.8% |
| 123.4 | 130.2 | 125.1 | 111.8 | 114.5 | 118.4 | -9.2% |

## Residential GHG Emissions by Fuel Type and End-Use

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total GHG Emissions Including Electricity (Mt)** [a,d,i] | **69.6** | **66.9** | **71.9** | **68.9** | **69.1** |
| ***GHG Emissions by Fuel Type (Mt)*** [a,d,i] | | | | | |
| Electricity | 26.2 | 25.0 | 28.9 | 23.8 | 23.3 |
| Natural Gas | 26.6 | 26.7 | 27.8 | 29.7 | 31.2 |
| Heating Oil | 13.7 | 11.9 | 12.2 | 12.7 | 12.0 |
| Wood | 1.8 | 1.7 | 1.7 | 1.8 | 1.8 |
| Propane | 1.2 | 1.2 | 1.1 | 0.7 | 0.7 |
| Coal and Other | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 |
| ***GHG Emissions by End-Use (Mt)*** [d,i] | | | | | |
| Space Heating | 41.3 | 39.8 | 42.6 | 42.6 | 42.5 |
| Water Heating | 15.2 | 14.6 | 15.4 | 14.5 | 14.9 |
| Appliances | 9.9 | 9.2 | 10.5 | 8.8 | 8.7 |
| Lighting | 2.9 | 2.8 | 3.2 | 2.6 | 2.6 |
| Space Cooling | 0.4 | 0.5 | 0.2 | 0.3 | 0.3 |
| **GHG Intensity (tonne/TJ)** [a,d,i] | **53.6** | **52.3** | **55.8** | **50.8** | **49.8** |
| **Total GHG Emissions Excluding Electricity (Mt)** [a,d,i] | **43.4** | **41.8** | **43.9** | **45.1** | **45.8** |
| ***GHG Emissions by End-Use (Mt)*** [d,i] | | | | | |
| Space Heating | 34.4 | 32.9 | 34.0 | 35.6 | 35.9 |
| Water Heating | 8.8 | 8.7 | 8.7 | 9.2 | 9.8 |
| Appliances | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Lighting | 0 | 0 | 0 | 0 | 0 |
| Space Cooling | 0 | 0 | 0 | 0 | 0 |
| **GHG Intensity (tonne/TJ)** [a,d,i] | **33.4** | **32.7** | **32.9** | **33.2** | **33.1** |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.

i) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| 1996 | 1998 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **68.5** | **73.9** | **72.4** | **69.2** | **70.7** | **74.7** | **7.5%** |
| | | | | | | |
| 24.0 | 23.8 | 26.3 | 28.6 | 28.2 | 30.0 | 14.5% |
| 31.5 | 34.8 | 32.3 | 28.8 | 30.4 | 32.3 | 21.4% |
| 10.1 | 11.7 | 10.8 | 9.2 | 9.6 | 9.7 | -29.2% |
| 1.8 | 1.7 | 2.0 | 1.6 | 1.7 | 1.8 | 0.0% |
| 0.8 | 0.8 | 0.8 | 0.7 | 0.6 | 0.7 | -41.7% |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.0% |
| | | | | | | |
| 41.4 | 45.7 | 43.4 | 37.8 | 39.6 | 42.8 | 3.6% |
| 14.9 | 15.3 | 15.7 | 16.2 | 16.1 | 16.6 | 9.2% |
| 8.9 | 8.8 | 9.8 | 11.0 | 10.8 | 11.2 | 13.1% |
| 2.7 | 2.7 | 3.0 | 3.5 | 3.5 | 3.6 | 24.1% |
| 0.5 | 0.4 | 0.4 | 0.7 | 0.8 | 0.5 | 25.0% |
| | | | | | | |
| **56.5** | **60.3** | **61.8** | **54.4** | **53.4** | **53.8** | **6.4%** |
| | | | | | | |
| **44.5** | **48.2** | **48.2** | **48.8** | **42.5** | **44.7** | **3.9%** |
| | | | | | | |
| 34.7 | 38.8 | 35.9 | 30.4 | 32.2 | 34.2 | -0.6% |
| 9.6 | 10.2 | 10.1 | 10.0 | 10.1 | 10.2 | 15.9% |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.0% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| | | | | | | |
| **32.8** | **33.9** | **32.9** | **31.9** | **32.1** | **32.2** | **-3.9%** |

## Residential Housing Stock and Floor Space

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Housing Stock (thousands) [d]** | **11,626** | **11,365** | **11,983** | **11,913** | **12,047** |
| ***Housing Stock by Building Type (thousands) [d]*** | | | | | |
| Single Detached | 5,997 | 6,219 | 6,267 | 6,405 | 6,575 |
| Single Attached | 1,014 | 1,044 | 1,140 | 1,179 | 1,235 |
| Apartments | 3,722 | 3,785 | 3,840 | 3,892 | 3,904 |
| Mobile Homes | 293 | 317 | 336 | 338 | 333 |
| ***Housing Stock by Vintage (thousands) [d]*** | | | | | |
| before 1946 | 2,089 | 2,082 | 2,072 | 2,061 | 2,049 |
| 1946–1960 | 2,098 | 2,093 | 2,088 | 2,081 | 2,077 |
| 1961–1977 | 3,194 | 3,190 | 3,181 | 3,165 | 3,155 |
| 1978–1983 | 1,263 | 1,200 | 1,190 | 1,181 | 1,174 |
| 1984–1995 | 2,382 | 2,800 | 3,051 | 3,325 | 3,591 |
| 1996–2000 | 0 | 0 | 0 | 0 | 0 |
| **Total Floor Space (million m²) [d]** | **1,254** | **1,308** | **1,327** | **1,359** | **1,383** |
| ***Floor Space by Building Type (million m²) [d]*** | | | | | |
| Single Detached | 794 | 829 | 837 | 861 | 887 |
| Single Attached | 115 | 118 | 129 | 134 | 140 |
| Apartments | 317 | 322 | 327 | 332 | 333 |
| Mobile Homes | 28 | 30 | 33 | 33 | 33 |
| ***Floor Space by Vintage (million m²) [d]*** | | | | | |
| before 1946 | 239 | 238 | 237 | 236 | 235 |
| 1946–1960 | 214 | 213 | 213 | 212 | 212 |
| 1961–1977 | 347 | 346 | 345 | 344 | 343 |
| 1978–1983 | 154 | 146 | 145 | 144 | 144 |
| 1984–1995 | 300 | 356 | 386 | 423 | 480 |
| 1996–2000 | 0 | 0 | 0 | 0 | 0 |
| **Average Size of Housing Unit (m²/house) [d]** | **113.7** | **114.4** | **114.5** | **115.1** | **115.6** |
| ***By House Type (m²/house) [d]*** | | | | | |
| Single Detached | 132.4 | 133.3 | 133.6 | 134.4 | 135 |
| Single Attached | 113.2 | 113.2 | 113.4 | 113.3 | 113.1 |
| Apartments | 85 | 85.1 | 85.2 | 85.3 | 85.4 |
| Mobile Homes | 95.2 | 96.2 | 97 | 97.7 | 97.9 |
| ***By Vintage (m²/house) [d]*** | | | | | |
| before 1946 | 114.4 | 114.5 | 114.5 | 114.6 | 114.6 |
| 1946–1960 | 101.9 | 101.9 | 101.9 | 101.9 | 101.9 |
| 1961–1977 | 108.6 | 108.6 | 108.6 | 108.7 | 108.7 |
| 1978–1983 | 121.8 | 122 | 122.1 | 122.4 | 122.4 |
| 1984–1995 | 126 | 127.1 | 126.4 | 127.1 | 128 |
| 1996–2000 | 0 | 0 | 0 | 0 | 0 |

**Sources:**
d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **12,278** | **12,330** | **12,257** | **12,324** | **12,374** | **12,582** | **13.9%** |
| | | | | | | |
| 6,638 | 6,696 | 6,735 | 6,827 | 6,856 | 6,949 | 15.9% |
| 1,344 | 1,353 | 1,321 | 1,320 | 1,348 | 1,355 | 33.6% |
| 3,972 | 3,998 | 3,911 | 3,876 | 3,891 | 3,949 | 6.1% |
| 324 | 283 | 290 | 301 | 279 | 298 | 1.7% |
| | | | | | | |
| 2,038 | 2,021 | 1,998 | 1,975 | 1,946 | 1,935 | -7.4% |
| 2,069 | 2,055 | 2,029 | 1,996 | 1,950 | 1,933 | -7.9% |
| 3,142 | 3,131 | 3,080 | 3,023 | 2,983 | 2,973 | -6.9% |
| 1,167 | 1,159 | 1,132 | 1,109 | 1,096 | 1,090 | -13.7% |
| 3,862 | 3,537 | 3,373 | 3,259 | 3,201 | 3,161 | 32.7% |
| 0 | 428 | 645 | 961 | 1,198 | 1,460 | – |
| | | | | | | |
| **1,429** | **1,433** | **1,432** | **1,448** | **1,458** | **1,484** | **18.9%** |
| | | | | | | |
| 897 | 910 | 918 | 936 | 943 | 960 | 20.9% |
| 151 | 154 | 151 | 152 | 155 | 157 | 36.5% |
| 340 | 342 | 334 | 331 | 333 | 338 | 6.6% |
| 32 | 28 | 29 | 30 | 27 | 29 | 3.6% |
| | | | | | | |
| 234 | 232 | 229 | 227 | 224 | 222 | -7.1% |
| 211 | 209 | 207 | 204 | 199 | 197 | -7.9% |
| 342 | 340 | 335 | 329 | 325 | 324 | -6.6% |
| 143 | 142 | 139 | 136 | 135 | 134 | -13.0% |
| 491 | 451 | 432 | 418 | 411 | 407 | 35.7% |
| 0 | 59 | 89 | 134 | 165 | 200 | – |
| | | | | | | |
| **116.7** | **116.3** | **116.8** | **117.5** | **117.9** | **118.3** | **4.9%** |
| | | | | | | |
| 135.2 | 136 | 136.3 | 137.1 | 137.6 | 138.1 | 4.3% |
| 112.6 | 113.5 | 114.3 | 115 | 115.3 | 115.9 | 2.4% |
| 85.5 | 85.5 | 85.4 | 85.3 | 85.5 | 85.6 | 0.7% |
| 98.2 | 98 | 98.2 | 98.5 | 98.5 | 98.7 | 3.7% |
| | | | | | | |
| 114.7 | 114.6 | 114.8 | 114.8 | 114.9 | 114.9 | 0.4% |
| 101.9 | 101.9 | 102 | 102 | 102.1 | 102.1 | 0.2% |
| 108.7 | 108.7 | 108.9 | 108.9 | 108.9 | 108.9 | 0.3% |
| 122.5 | 122.6 | 122.8 | 122.9 | 122.9 | 123 | 1.0% |
| 127.1 | 127.6 | 128 | 128.4 | 128.5 | 128.7 | 2.1% |
| 0 | 137.1 | 137.9 | 139.4 | 138 | 138.9 | – |

## Residential Lighting and Space Cooling Details

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Lighting Energy Use (PJ)[*] [g]** | **82** | **81.4** | **82.7** | **82** | **83.9** |
| **Activity** | | | | | |
| Total Floor Space (million m²) [c] | 1,253.5 | 1300.0 | 1,326.6 | 1,359.4 | 1,393.0 |
| **Energy Intensity (MJ/m²) [g]** | **41.5** | **39.8** | **38.7** | **38.3** | **38.7** |
| **Heat Loss (PJ) [g]** | **21.3** | **21.3** | **23.1** | **22.3** | **23.5** |
| **Total Space Cooling Energy Use (PJ)[*] [g]** | **6.9** | **6.5** | **3.5** | **7** | **7.2** |
| ***Energy Use by Cooling-System Type (PJ) [g]*** | | | | | |
| Room | 1.4 | 1.7 | 0.6 | 1.1 | 1.1 |
| Central | 5.5 | 7.8 | 2.9 | 5.8 | 6 |
| **Activity** | | | | | |
| Floor Space (million m²) [c] | 318 | 342.1 | 356.9 | 377.5 | 394.9 |
| **Energy Intensity (MJ/m²) [g]** | **21.7** | **27.8** | **9.8** | **18.4** | **18.1** |
| **Cooling Degree-Days Index [b]** | **1.05** | **1.35** | **0.94** | **0.99** | **0.99** |
| **Total Cooling System Stock (thousands) [c,d,g]** | **2,488** | **2,819** | **2,721** | **2,888** | **2,988** |
| ***System Stock by Cooling-System Type (thousands) [c,d,g]*** | | | | | |
| Room | 1,090 | 1,091 | 1,079 | 1,095 | 1,104 |
| Central | 1,376 | 1,528 | 1,642 | 1,765 | 1,884 |
| **Cooling Systems New Units Efficiencies [g]** | | | | | |
| Room (EER)[1] | 7.1 | 7.2 | 8.4 | 8.4 | 9.1 |
| Central (SEER)[2] | 9.1 | 9.3 | 9.6 | 9.7 | 10.2 |
| **Cooling Systems Stock Efficiencies [g]** | | | | | |
| Room (EER)[1] | 6.8 | 6.9 | 6.9 | 7 | 7.2 |
| Central (SEER)[2] | 8.5 | 8.7 | 8.8 | 8.9 | 9.1 |

[*] Lighting and space cooling consume only electricity.
1) Energy Efficiency Ratio.
2) Seasonal Energy Efficiency Ratio.

**Sources:**
b) Statistics Canada, *Survey of Household Spending in 1997–2000*, Ottawa, October 2001, (Cat. No. 62F0041).
c) Statistics Canada, *Household Facilities and Equipment, 1990–1997*, Ottawa, October 1990 – October 1997, (Cat. No. 64-202).
d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
g) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days above 18.0°C*, Toronto, 1990–2000.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1995–2000 |
|---|---|---|---|---|---|---|
| 88.7 | 88.8 | 88.9 | 88.7 | 88.7 | 89.3 | 10.9% |
| 1,420.1 | 1,433.5 | 1,431.6 | 1,448.4 | 1,458.7 | 1,484.4 | 18.4% |
| 37.8 | 38.8 | 38 | 39.2 | 40.3 | 44.8 | -2.2% |
| 23.4 | 25.3 | 24.4 | 21.2 | 23.1 | 25.8 | 21.1% |
| 9.4 | 7.9 | 7.8 | 11.8 | 13 | 8.8 | 24.8% |
| 1.4 | 1.2 | 1.2 | 1.7 | 1.9 | 1.2 | -14.3% |
| 8 | 6.7 | 6.4 | 10.1 | 11.1 | 7.4 | 34.5% |
| 415.9 | 440.4 | 463.2 | 488.7 | 501.4 | 514.9 | 61.9% |
| 22.7 | 18 | 18.3 | 24.1 | 25.9 | 19.7 | -22.9% |
| 1.14 | 0.98 | 0.89 | 1.26 | 1.42 | 0.98 | -18.1% |
| 3,121 | 3,319 | 3,516 | 3,788 | 3,884 | 3,941 | 99.8% |
| 1,158 | 1,257 | 1,353 | 1,405 | 1,448 | 1,451 | 33.1% |
| 1,963 | 2,061 | 2,163 | 2,304 | 2,406 | 2,490 | 81.0% |
| 9.2 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 32.4% |
| 10.2 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 13.2% |
| 7.4 | 7.6 | 7.8 | 7.9 | 8.1 | 8.3 | 22.1% |
| 9.2 | 9.3 | 9.4 | 9.5 | 9.6 | 9.7 | 14.1% |

## Residential Appliances Details

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Appliances Energy Use (PJ) [a]** | **170.8** | **171.1** | **173** | **176.6** | **179.6** |
| ***Energy Use by Fuel Type (PJ) [a]*** | | | | | |
| Electricity | 173.1 | 167.5 | 169.6 | 172.7 | 175.9 |
| Natural Gas | 3.6 | 3.6 | 3.4 | 3.8 | 3.7 |
| ***Energy Use by Appliance Type (PJ) [a]*** | | | | | |
| Refrigerator | 51.6 | 49.7 | 49.3 | 47.2 | 46.3 |
| Freezer | 21 | 20.3 | 20 | 19.3 | 19.3 |
| Dishwasher[1] | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| Clothes Washer[1] | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 |
| Clothes Dryer | 28.1 | 27.3 | 27.5 | 27 | 27.4 |
| Range | 24.2 | 23.8 | 24.3 | 24.4 | 25.2 |
| Other* | 47.6 | 46 | 47.7 | 54.6 | 57.4 |
| **Activity** | | | | | |
| Total Households (thousands) [b,c,d] | 9,966 | 10,255 | 10,437 | 10,633 | 10,793 |
| **Energy Intensity (GJ/household) [b,c,d]** | **17.7** | **16.7** | **16.6** | **16.6** | **16.6** |
| **Heat Loss by Appliance Type (PJ) [e]** | | | | | |
| Refrigerator | 21.5 | 20.9 | 21.9 | 21.4 | 20.5 |
| Freezer | 8.8 | 8.6 | 8.9 | 8.8 | 8.6 |
| Dishwasher | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| Clothes Washer | 1 | 0.9 | 1 | 1 | 1 |
| Clothes Dryer | 3.3 | 3.2 | 3.4 | 3.4 | 3.4 |
| Range | 10 | 10 | 10.8 | 11.1 | 11.1 |
| Other* | 19.7 | 19.3 | 21.2 | 24.8 | 25.4 |
| **Penetration Rate by Appliance Type (appliances per household) [b,c,d]** | | | | | |
| Refrigerator | 1.18 | 1.18 | 1.18 | 1.19 | 1.18 |
| Freezer | 0.57 | 0.57 | 0.57 | 0.58 | 0.58 |
| Dishwasher | 0.42 | 0.43 | 0.44 | 0.45 | 0.46 |
| Clothes Washer | 0.75 | 0.74 | 0.75 | 0.76 | 0.76 |
| Clothes Dryer | 0.73 | 0.73 | 0.73 | 0.74 | 0.74 |
| Range | 0.98 | 0.98 | 0.99 | 0.99 | 0.98 |

* "Other" includes televisions, video cassette recorders, digital video disc players, radios, computers, toasters, etc.
1) Excludes hot water requirements.

**Sources:**
b) Statistics Canada, *Survey of Household Spending in 1997–2000*, Ottawa, October 2001, (Cat. No. 62F0041).
c) Statistics Canada, *Household Facilities and Equipment, 1990–1997*, Ottawa, October 1990 – October 1997, (Cat. No. 64-202).
d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
e) Special tabulations from *Energy Consumption of Major Household Appliances Marketed in Canada —Trends for 1990–2000*, Ottawa.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **178.6** | **180.6** | **181.7** | **180.5** | **183.7** | **188** | **5.2%** |
| | | | | | | |
| 172.9 | 176.2 | 177.4 | 176.3 | 179.5 | 181.7 | 5.0% |
| 3.7 | 4.4 | 4.3 | 4.3 | 4.2 | 4.3 | 19.4% |
| | | | | | | |
| 43.9 | 43.9 | 42.6 | 40.8 | 40.8 | 39.6 | -23.6% |
| 18.2 | 18 | 17.7 | 16.7 | 15.9 | 15.5 | -26.2% |
| 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.8 | 0.0% |
| 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 0.0% |
| 27.2 | 27.7 | 28.3 | 28.4 | 28.5 | 29 | 3.2% |
| 25.2 | 26.4 | 26.4 | 26.6 | 27.5 | 28.3 | 16.9% |
| 58 | 60.6 | 62.6 | 63.9 | 66.9 | 69.6 | 46.2% |
| | | | | | | |
| 10,977 | 11,148 | 11,224 | 11,385 | 11,553 | 11,728 | 17.7% |
| | | | | | | |
| **16.1** | **16.2** | **16.2** | **15.9** | **15.9** | **15.9** | **-10.2%** |
| | | | | | | |
| 19.4 | 20.2 | 18.8 | 15.4 | 16.2 | 17.1 | -20.5% |
| 8.1 | 8.4 | 7.9 | 6.4 | 6.4 | 6.8 | -22.7% |
| 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.8 | 0.0% |
| 1 | 1.1 | 1 | 0.9 | 0.9 | 1 | 0.0% |
| 3.4 | 3.6 | 3.5 | 3 | 3.2 | 3.5 | 6.1% |
| 11.1 | 12.1 | 11.6 | 10 | 10.9 | 12.2 | 22.0% |
| 25.7 | 27.8 | 27.7 | 24.2 | 26.5 | 30.1 | 52.8% |
| | | | | | | |
| 1.18 | 1.20 | 1.22 | 1.22 | 1.24 | 1.22 | 3.4% |
| 0.57 | 0.57 | 0.59 | 0.59 | 0.58 | 0.58 | 1.8% |
| 0.47 | 0.48 | 0.49 | 0.51 | 0.49 | 0.51 | 21.4% |
| 0.78 | 0.78 | 0.81 | 0.81 | 0.80 | 0.81 | 8.0% |
| 0.76 | 0.76 | 0.80 | 0.81 | 0.80 | 0.81 | 11.0% |
| 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 1.0% |

*continued*

## Residential Appliances Details *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **UEC[2] for New Electric Appliances (kWh/year) [e]** | | | | | |
| Refrigerator | 956 | 931 | 902 | 720 | 650 |
| Freezer | 714 | 445 | 449 | 402 | 389 |
| Dishwasher[1] | 123 | 115 | 109 | 110 | 93 |
| Clothes Washer[1] | 97 | 96 | 94 | 88 | 79 |
| Clothes Dryer | 1,103 | 1,109 | 983 | 928 | 910 |
| Range | 772 | 778 | 779 | 782 | 774 |
| **UEC[2] for New Natural Gas Appliances (kWh/year) [e]** | | | | | |
| Clothes Dryer | 925 | 912 | 906 | 903 | 896 |
| Range | 1,357 | 1,294 | 1,283 | 1,267 | 1,251 |
| **UEC[2] for Stock of Electric Appliances (kWh/year) [e]** | | | | | |
| Refrigerator | 1,525 | 1,478 | 1,427 | 1,363 | 1,294 |
| Freezer | 1,291 | 1,250 | 1,206 | 1,157 | 1,108 |
| Dishwasher[1] | 153 | 149 | 144 | 139 | 133 |
| Clothes Washer[1] | 106 | 105 | 103 | 101 | 99 |
| Clothes Dryer | 1,314 | 1,293 | 1,265 | 1,233 | 1,200 |
| Range | 802 | 800 | 798 | 796 | 793 |
| **UEC[2] for Stock of Natural Gas Appliances (kWh/year) [e]** | | | | | |
| Clothes Dryer | 1,468 | 1,398 | 1,314 | 1,228 | 1,156 |
| Range | 1,534 | 1,521 | 1,505 | 1,481 | 1,456 |

* "Other" includes televisions, video cassette recorders, digital video disc players, radios, computers, toasters, etc.
1) Excludes hot water requirements.
2) Unit energy consumption based on rated efficiency.

**Sources:**
b) Statistics Canada, *Survey of Household Spending in 1997–2000*, Ottawa, October 2001, (Cat. No. 62F0041).
c) Statistics Canada, *Household Facilities and Equipment,1990–1997*, Ottawa, October 1990 – October 1997, (Cat. No. 64-202).
d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.
e) Special tabulations from *Energy Consumption of Major Household Appliances Marketed in Canada —Trends for 1990–2000*, Ottawa.

continued

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| 642 | 640 | 657 | 651 | 645 | 640 | -33.1% |
| 382 | 377 | 376 | 381 | 383 | 391 | -45.2% |
| 81 | 80 | 78 | 78 | 77 | 76 | -38.2% |
| 77 | 76 | 74 | 72 | 69 | 67 | -30.9% |
| 909 | 887 | 887 | 900 | 908 | 910 | -17.5% |
| 771 | 774 | 772 | 771 | 759 | 760 | -1.6% |
| 889 | 880 | 880 | 880 | 880 | 880 | -4.9% |
| 1,236 | 1,226 | 1,226 | 1,226 | 1,226 | 1,226 | -9.7% |
| 1,230 | 1,166 | 1,105 | 1,047 | 993 | 945 | -38.0% |
| 1,057 | 1,005 | 949 | 893 | 836 | 782 | -39.4% |
| 127 | 122 | 116 | 111 | 106 | 101 | -34.0% |
| 97 | 94 | 92 | 89 | 87 | 84 | -20.8% |
| 1,171 | 1,141 | 1,112 | 1,087 | 1,063 | 1,042 | -20.7% |
| 791 | 789 | 787 | 785 | 782 | 780 | -2.7% |
| 1,100 | 1,050 | 1,010 | 979 | 955 | 938 | -36.1% |
| 1,432 | 1,410 | 1,387 | 1,364 | 1,344 | 1,326 | -13.6% |

## Residential Space Heating Energy Use and System Stock Share

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Space Heating Energy Use (PJ) [d]** | **784.7** | **770.2** | **801.3** | **837.1** | **849.8** |
| ***Energy Use by Fuel Type (PJ) [d]*** | | | | | |
| Electricity | 122.5 | 127.4 | 140.1 | 138.7 | 136.4 |
| Natural Gas | 380.4 | 382.9 | 401.1 | 430.6 | 455.6 |
| Heating Oil | 167.5 | 146.2 | 151.9 | 156.7 | 147.3 |
| Wood | 95.5 | 94.5 | 90.8 | 99.1 | 98.7 |
| Propane | 16.9 | 17.3 | 15.5 | 10.3 | 10.5 |
| Coal and Other | 1.9 | 1.9 | 1.8 | 1.7 | 1.4 |
| ***Energy Use by Vintage (PJ) [d]*** | | | | | |
| before 1946 | 226.8 | 216.4 | 224.8 | 230.5 | 228.4 |
| 1946–1960 | 154.7 | 147.4 | 151.4 | 155.5 | 154.8 |
| 1961–1977 | 196.7 | 188.4 | 191.5 | 196.7 | 196.6 |
| 1978–1983 | 85 | 77.5 | 78.5 | 80.4 | 80.3 |
| 1984–1995 | 121.4 | 140.5 | 155.1 | 174 | 189.8 |
| 1996–2000 | 0 | 0 | 0 | 0 | 0 |
| **Activity** | | | | | |
| Total Floor Space (million m²) [d] | 1,253.5 | 1,300.0 | 1,326.6 | 1,359.4 | 1,393.0 |
| **Energy Intensity (GJ/m²) [d]** | **0.63** | **0.59** | **0.6** | **0.62** | **0.61** |
| **Heat Gains (PJ) [d]** | **91.3** | **90** | **96.4** | **100.1** | **100** |
| **Heating Degree-Days Index [f]** | **0.92** | **0.93** | **0.99** | **1.01** | **0.99** |
| **Heating System Stock Share by System Type (%) [d]** | | | | | |
| Heating Oil – Normal Efficiency | 14 | 12.8 | 12 | 10.6 | 10.6 |
| Heating Oil – Medium Efficiency | 0.2 | 1.4 | 1.3 | 1.2 | 1.3 |
| Heating Oil – High Efficiency | 0 | 0 | 0 | 0 | 0 |
| Natural Gas – Normal Efficiency | 40.4 | 39.8 | 39.2 | 38.6 | 38 |
| Natural Gas – Medium Efficiency | 1.1 | 1.3 | 2.5 | 3.6 | 4.6 |
| Natural Gas – High Efficiency | 2.3 | 2.5 | 2.9 | 3.2 | 3.7 |
| Electric | 28 | 28.6 | 29 | 29.1 | 27.8 |
| Heat Pump | 2.3 | 2.3 | 2.5 | 2.6 | 2.8 |
| Propane | 0.8 | 0.7 | 0.8 | 0.8 | 1 |
| Wood | 1.6 | 1.6 | 1.1 | 1.7 | 1.9 |
| Coal and Other | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 |
| ***Duals*** | | | | | |
| Wood/Electric | 5.5 | 5.2 | 4.9 | 4.7 | 4.6 |
| Wood/Heating Oil | 2.6 | 2.4 | 2.3 | 2.3 | 2.2 |
| Gas/Electric | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 |
| Heating Oil/Electric | 0.9 | 0.9 | 1 | 1 | 1 |

**Sources:**

d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.

f) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days below 18.0°C*, Toronto, 1990–2000.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **824.3** | **904.5** | **868.4** | **729.8** | **769.8** | **830.7** | **5.5%** |
| 133.6 | 142 | 139.4 | 120 | 125.6 | 141.9 | 15.8% |
| 455.6 | 509.8 | 467.2 | 399.8 | 428.1 | 461 | 21.2% |
| 125.3 | 145.3 | 132.2 | 111.2 | 116.1 | 117.9 | -29.6% |
| 95.3 | 92.7 | 108.5 | 87.8 | 90.3 | 99.3 | 4.0% |
| 12.3 | 12.5 | 11.1 | 9.5 | 8.1 | 9 | -46.7% |
| 2.2 | 2.1 | 1.9 | 1.6 | 1.6 | 1.5 | -21.1% |
| 216.9 | 234.7 | 222.5 | 179.4 | 188.4 | 201.6 | -11.1% |
| 148.3 | 160.9 | 151 | 125.1 | 129.1 | 136.4 | -11.8% |
| 189.2 | 207.1 | 192.5 | 162.7 | 167.8 | 178.2 | -9.4% |
| 77 | 84.2 | 77.7 | 65.5 | 67.6 | 71.9 | -15.4% |
| 193 | 190.8 | 176.5 | 145.7 | 150.7 | 157.7 | 29.9% |
| 0 | 26.9 | 40.2 | 51.5 | 66.2 | 84.9 | – |
| 1,420.1 | 1,433.5 | 1,431.6 | 1,448.4 | 1,458.7 | 1,484.4 | 18.4% |
| **0.58** | **0.63** | **0.6** | **0.5** | **0.53** | **0.56** | **-11.1%** |
| **98.5** | **105.4** | **101.5** | **86.7** | **93** | **103.1** | **12.9%** |
| **0.99** | **1.03** | **0.98** | **0.85** | **0.89** | **0.96** | **4.3%** |
| 9.8 | 9.2 | 8.3 | 8 | 7.4 | 7 | |
| 1.8 | 1.9 | 1.9 | 2.5 | 3.5 | 2.8 | |
| 0 | 0 | 0 | 0 | 0 | 0 | |
| 36.6 | 35.2 | 33.1 | 31.6 | 30.6 | 28.4 | |
| 5.4 | 6.1 | 7.1 | 8.3 | 8.9 | 10.5 | |
| 4.1 | 4.7 | 5.3 | 6.2 | 6.5 | 7.1 | |
| 28.5 | 29.5 | 29.4 | 29.2 | 28.6 | 29.5 | |
| 2.8 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | |
| 1 | 0.9 | 1.1 | 1 | 1.1 | 1.2 | |
| 1.3 | 1.4 | 2.6 | 2.2 | 2.2 | 2.3 | |
| 0.1 | 0.1 | 0.3 | 0.1 | 0.4 | 0.3 | |
| 5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.5 | |
| 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | |
| 1 | 1 | 1 | 1 | 1 | 1 | |

## Residential Water Heating Energy Use and Water Heater Stock Share

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Water Heating Energy Use (PJ) [d]** | **279.4** | **275.6** | **276.9** | **283.5** | **295.3** |
| ***Energy Use by Fuel Type (PJ) [d]*** | | | | | |
| Electricity | 112.6 | 109.9 | 110.1 | 106.3 | 105.1 |
| Natural Gas | 144.4 | 145.3 | 148.8 | 159.1 | 172.2 |
| Heating Oil | 16.8 | 16 | 14.7 | 15.8 | 15.8 |
| Wood | 0.3 | 0.3 | 0.2 | 0.4 | 0.3 |
| Propane | 3 | 4 | 2.9 | 1.8 | 1.8 |
| Coal and Other | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 |
| **Activity** | | | | | |
| Total Households (thousands) [b,c,d] | 9,966 | 10,255 | 10,437 | 10,633 | 10,793 |
| **Energy Intensity (GJ/household) [b,c,d]** | **28** | **26.9** | **26.5** | **26.7** | **27.4** |
| **Water Heater Stock Market Shares (%) [d]** | | | | | |
| Electricity | 55.7 | 55.8 | 55 | 53.9 | 52.5 |
| Natural Gas | 39.1 | 39.2 | 40.5 | 41.7 | 42.7 |
| Heating Oil | 4.7 | 4.4 | 4 | 3.8 | 4.1 |
| Wood | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Propane | 0.4 | 0.5 | 0.5 | 0.5 | 0.6 |
| Coal and Other | 0 | 0.1 | 0 | 0 | 0.1 |
| **Heat Loss (PJ) [d]** | **5** | **4.9** | **5.2** | **5.5** | **5.8** |

**Sources:**
b) Statistics Canada, *Survey of Household Spending in 1997–2000*, Ottawa, October 2001, (Cat. No. 62F0041).
c) Statistics Canada, *Household Facilities and Equipment,1990–1997*, Ottawa, October 1990–October 1997, (Cat. No. 64-202).
d) Natural Resources Canada, Residential End-Use Model, Ottawa, February 2002.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **290.7** | **282.5** | **290** | **293.6** | **296.1** | **302.4** | **8.2%** |
| | | | | | | |
| 104.3 | 105.2 | 103.9 | 100.8 | 103 | 105.1 | -6.8% |
| 171.1 | 181.8 | 176.5 | 173.7 | 177 | 179.5 | 24.3% |
| 12.8 | 13.6 | 14.8 | 14.9 | 14.8 | 14.5 | -22.9% |
| 0.2 | 0.2 | 0.9 | 1.4 | 0.8 | 0.9 | 200.0% |
| 2.1 | 1.6 | 2.7 | 2.9 | 2.4 | 2.3 | -23.3% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0% |
| | | | | | | |
| 10,977 | 11,148 | 11,224 | 11,385 | 11,553 | 11,728 | 17.7% |
| | | | | | | |
| **26.5** | **27.1** | **26.8** | **25.8** | **25.8** | **25.8** | **-7.5%** |
| | | | | | | |
| 52.7 | 52.8 | 52.3 | 51.1 | 51.1 | 51.1 | |
| 42.7 | 42.9 | 42.7 | 43.4 | 43.7 | 43.6 | |
| 3.9 | 3.7 | 3.9 | 4.3 | 4.1 | 4.1 | |
| 0.1 | 0.1 | 0.2 | 0.4 | 0.2 | 0.2 | |
| 0.6 | 0.5 | 0.8 | 0.9 | 0.9 | 0.9 | |
| 0 | 0 | 0.1 | 0 | 0.1 | 0.1 | |
| | | | | | | |
| **5.5** | **6.1** | **5.7** | **4.9** | **5.2** | **5.8** | **16.9%** |

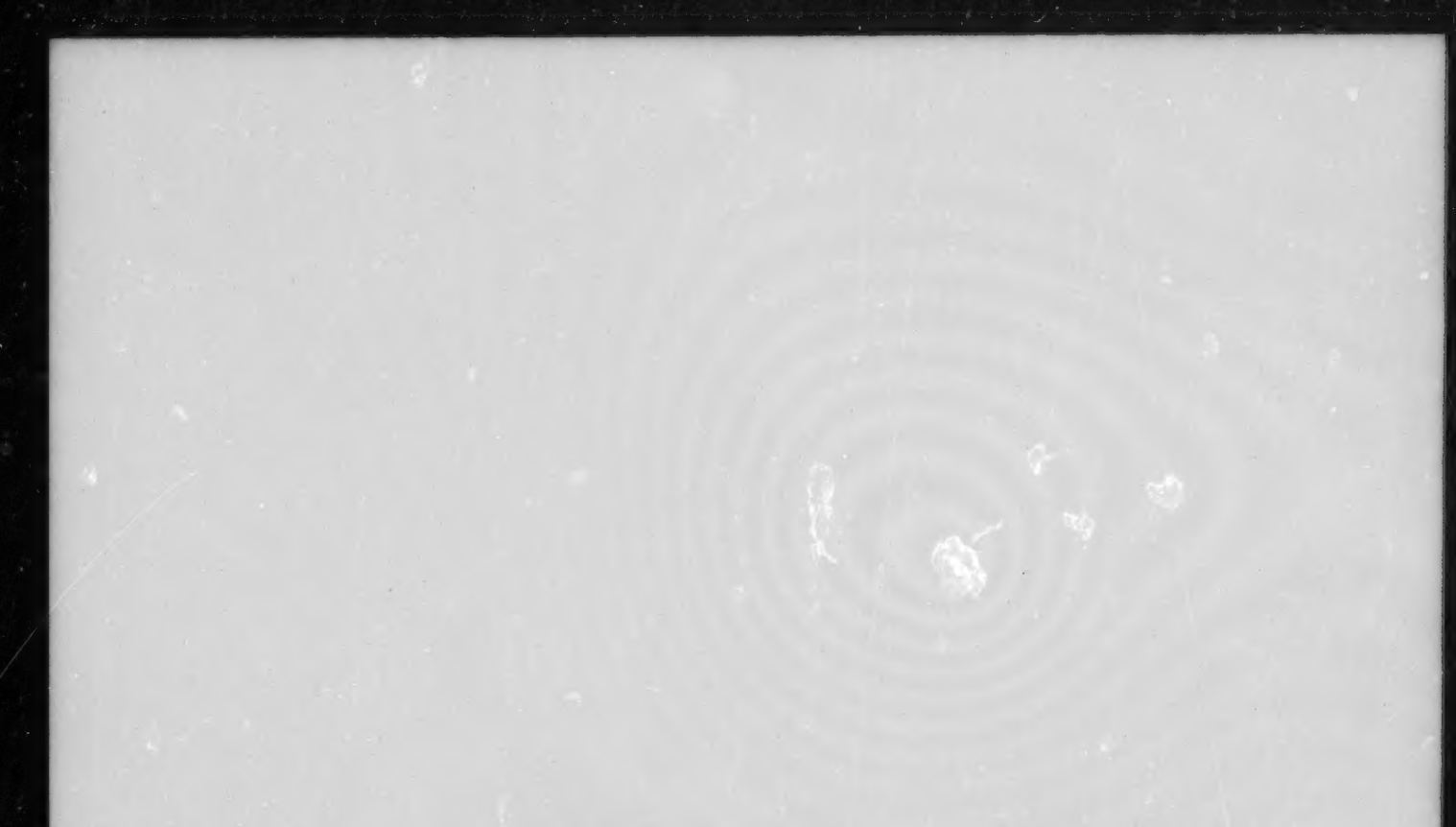
# Chapter 3 Commercial/ Institutional Sector

## The Data Situation

Of the five sectors of the economy reviewed in this report, the commercial/ institutional sector has the most significant data limitations.

Statistics Canada published the data on aggregate commercial/institutional energy use under the "commercial and other institutional" and "public administration" categories in its *Quarterly Report on Energy Supply-Demand in Canada* (QRESD) (Cat. No. 57-003). As well, energy use data in the commercial/institutional sector is not quantified through a data collection exercise – it is essentially the residual of energy use not accounted for in the residential, industrial, transportation and agriculture sectors. Another key variable in this sector is floor space, which is used as an approximation for commercial/institutional activity. Since reliable national data on commercial/institutional floor space is non-existent, estimates are based on investment flows and average new construction costs per floor area. In 1997, floor space estimates were benchmarked against provincial data from surveys and audits.

To address the problem of data limitation in the commercial/institutional sector, the Office of Energy Efficiency (OEE), through the National Energy Use Database, funded the *Commercial and Institutional Building Energy Use Survey*. This survey will be the first to provide national data on commercial/institutional floor space and energy use. It is being conducted by Statistics Canada on behalf of Natural Resources Canada (NRCan). Results are expected for summer 2002.



The OEE developed the Commercial Energy Use Model (CEUM) to assess trends in energy use in the Canadian commercial/institutional sector. It uses floor space estimates by region and building type (from Informetrica Limited) and energy intensity estimates by region, building type and end-use (from NRCan) to allocate the energy use reported by Statistics Canada in the QRESD to nine building types and six end-uses.

The model also takes into account the influence of weather in commercial/institutional energy demand. To do so, it uses the number of heating degree-days in *Monthly Summary of Degree-Days below 18.0°C* and the number of cooling degree-days in *Monthly Summary of Degree-Days above 18.0°C*, two reports from Environment Canada.

## Commercial Energy Use by Fuel Type, End-Use and Building Type

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Energy Use (PJ) *** | 897 | 888.9 | 901.2 | 883.1 | 927.6 |
| ***Energy Use by Fuel Type (PJ) **** | | | | | |
| Electricity | 390.1 | 396 | 397.6 | 408 | 409.5 |
| Natural Gas | 367.1 | 403.4 | 416.6 | 433.1 | 420.2 |
| Propane | 16.1 | 18.3 | 18.6 | 22.8 | 33.1 |
| Light Fuel Oil and Kerosene | 82 | 58.1 | 56.9 | 57.7 | 52.4 |
| Heavy Fuel Oil | 11.4 | 11 | 11.5 | 11.2 | 11.9 |
| Other | 0.4 | 0.2 | 0 | 0.3 | 0.5 |
| ***Energy Use by End-Use (PJ) */*** | | | | | |
| Lighting | 127.4 | 129 | 130.3 | 131.8 | 133.2 |
| Space Cooling | 39.8 | 49.8 | 29.1 | 40.4 | 44.1 |
| Auxiliary Motors | 103.8 | 105.2 | 106.2 | 107.3 | 108 |
| Auxiliary Equipment | 65.5 | 67.3 | 67.2 | 67.8 | 68.6 |
| Space Heating | 428.1 | 434.4 | 465.6 | 482 | 469.4 |
| Water Heating | 93.3 | 94.5 | 94.3 | 95.5 | 96.2 |
| Street Lighting | 8.9 | 8.7 | 8.4 | 8.3 | 8.0 |
| ***Energy Use by Building Type (PJ) * **** | | | | | |
| Schools | 119 | 121.3 | 125.6 | 130 | 127.6 |
| Health Care Institutions | 106.1 | 107.3 | 110.3 | 113.2 | 112.1 |
| Religious Institutions | 11.6 | 11.5 | 11.8 | 11.9 | 11.6 |
| Other Institutions | 33.6 | 35.3 | 36 | 36.2 | 36.1 |
| Offices | 189.8 | 197.5 | 203.2 | 210.7 | 212.6 |
| Retail Organizations | 220.6 | 224.3 | 221.6 | 229 | 226.3 |
| Hotels and Restaurants | 76.6 | 80.9 | 79 | 83 | 83.8 |
| Recreational Facilities | 49 | 50.6 | 53.6 | 56.2 | 56.6 |
| Warehouses | 51.7 | 51.5 | 51.8 | 52.7 | 50.9 |

*Excludes street lighting.

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Informetrica Limited, *TIMM Database and Historical Estimates of Commercial Floor Space*, 1998 Database Update, Ottawa, January 2001.

c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.

d) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days below 18.0°C*, Toronto, 1990–2000.

e) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days above 18.0°C*, Toronto, 1990–2000.

f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1998*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.

| 1990 | 1991 | 1992 | 1993 | 1994 | 2000 | Total Growth 1990-2000 |
|---|---|---|---|---|---|---|
| 868.9 | 891.5 | 908.8 | 944.1 | 979.2 | 1,068.8 | 22.1% |
| | | | | | | |
| 421.2 | 426.9 | 436.6 | 431.3 | 436.8 | 453.1 | 18.1% |
| 427.6 | 451.2 | 452.7 | 418.5 | 443.8 | 488.5 | 26.2% |
| 41.8 | 34.3 | 39.3 | 29.5 | 34.3 | 36.1 | 124.2% |
| 61.2 | 59.7 | 57.5 | 47.6 | 47 | 60.4 | -2.6% |
| 8.6 | 9 | 11.8 | 16.8 | 17 | 19.8 | 73.7% |
| 0.5 | 0.4 | 0.6 | 0.4 | 0.3 | 1 | 150.0% |
| | | | | | | |
| 133.3 | 133.7 | 136.4 | 139 | 141.7 | 151.2 | 18.7% |
| 47.5 | 44.7 | 44.4 | 61 | 62.3 | 46.1 | 15.8% |
| 108.3 | 108.5 | 110 | 112 | 114 | 120.8 | 16.4% |
| 68.4 | 68.4 | 70.2 | 71.4 | 73.5 | 78.5 | 19.8% |
| 499.6 | 522.5 | 532.9 | 455.3 | 481 | 550.8 | 28.7% |
| 96.2 | 96.2 | 97.1 | 97.9 | 99.3 | 104.1 | 11.6% |
| 7.8 | 7.5 | 7.4 | 7.5 | 7.4 | 7.3 | -18.0% |
| | | | | | | |
| 133.2 | 139 | 140.1 | 126.6 | 132.2 | 147.8 | 24.2% |
| 115.9 | 119.2 | 120.9 | 113.3 | 117.7 | 124.8 | 17.6% |
| 11.8 | 12.1 | 12 | 10.9 | 11.4 | 12 | 3.4% |
| 40.5 | 42.5 | 42.9 | 39.4 | 41.4 | 44 | 31.6% |
| 222.6 | 229.8 | 239.7 | 224.7 | 234.6 | 261.2 | 37.6% |
| 230.7 | 229.7 | 231.9 | 227.7 | 234.1 | 254.4 | 15.3% |
| 86.5 | 86.1 | 87.7 | 86.3 | 88.6 | 90.2 | 17.4% |
| 60.9 | 63.5 | 64.4 | 59.4 | 61.3 | 64.5 | 31.6% |
| 52.1 | 52.3 | 51.4 | 48.4 | 50.5 | 52.6 | 1.7% |

continued

## Commercial Energy Use by Fuel Type, End-Use and Building Type *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Activity** | | | | | |
| Total Floor Space (million m²) [b] | 465.9 | 480.4 | 491 | 498.8 | 503.9 |
| **Energy Intensity (GJ/m²)* [a,b]** | **1.84** | **1.83** | **1.82** | **1.85** | **1.83** |
| **Heating Degree-Days Index [d]** | **0.92** | **0.93** | **0.99** | **1.01** | **0.99** |
| **Cooling Degree-Days Index [e]** | **1.05** | **1.35** | **0.94** | **0.99** | **0.99** |

*Excludes street lighting.

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Informetrica Limited, *TIM/RIM Database and Historical Estimates of Commercial Floor Space*, 1998 Database Update, Ottawa, January 2001.

c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.

d) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days below 18.0°C*, Toronto, 1990–2000.

e) Environment Canada, Atmospheric Environment Service, *Monthly Summary of Degree-Days above 18.0°C*, Toronto, 1990–2000.

f) Statistics Canada, *Electric Power Annual Statistics*, 1999, Ottawa, July 2001; (Cat. 57-202).
Data for 2000 estimated by Natural Resources Canada.

*continued*

| 1996 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| 508.8 | 513.5 | 520.5 | 529.4 | 545.8 | 578.1 | 24.1% |
| 1.87 | 1.9 | 1.9 | 1.77 | 1.78 | 1.82 | -1.1% |
| 0.99 | 1.03 | 0.98 | 0.85 | 0.89 | 0.96 | 4.3% |
| 1.14 | 0.98 | 0.89 | 1.26 | 1.42 | 0.88 | -18.1% |

## Commercial Energy Use by Building Type and Fuel Type

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Energy Use by Schools (PJ) [c]** | **119** | **121.3** | **125.6** | **130** | **127.6** |
| ***Energy Use by Fuel Type (PJ) [c]*** | | | | | |
| Electricity | 31.2 | 31.6 | 33.5 | 33.6 | 33.4 |
| Natural Gas | 70.7 | 73.2 | 75.5 | 79.1 | 75.2 |
| Propane | 2.5 | 2.8 | 3 | 3.7 | 6.1 |
| Light Fuel Oil and Kerosene | 12.2 | 11.5 | 11.2 | 11.3 | 10.2 |
| Heavy Fuel Oil | 2.3 | 2.2 | 2.3 | 2.3 | 2.5 |
| Other | 0.1 | 0 | 0 | 0.1 | 0.1 |
| **Activity** | | | | | |
| Floor Space (million m²) [b] | 66.88 | 69.16 | 70.71 | 71.97 | 73.06 |
| **Energy Intensity (GJ/m²) [b,c]** | **1.78** | **1.75** | **1.78** | **1.81** | **1.75** |
| **Total Energy Use by Health Care Institutions (PJ) [c]** | **106.1** | **107.3** | **110.3** | **113.2** | **112.1** |
| ***Energy Use by Fuel Type (PJ) [c]*** | | | | | |
| Electricity | 33.4 | 33.4 | 34.6 | 34.6 | 34.6 |
| Natural Gas | 57.5 | 59.8 | 61.6 | 63.9 | 62.1 |
| Propane | 1.6 | 1.7 | 1.9 | 2.2 | 3.5 |
| Light Fuel Oil and Kerosene | 11.4 | 10.5 | 10.2 | 10.3 | 9.4 |
| Heavy Fuel Oil | 2.1 | 1.8 | 2.1 | 2.1 | 2.4 |
| Other | 0 | 0 | 0 | 0 | 0.1 |
| **Activity** | | | | | |
| Floor Space (million m²) [b] | 32.75 | 33.15 | 33.98 | 34.25 | 34.83 |
| **Energy Intensity (GJ/m²) [b,c]** | **3.24** | **3.24** | **3.25** | **3.3** | **3.22** |
| **Total Energy Use by Religious Institutions (PJ) [c]** | **11.6** | **11.6** | **11.8** | **11.9** | **11.6** |
| ***Energy Use by Fuel Type (PJ) [c]*** | | | | | |
| Electricity | 3.2 | 3.1 | 3.2 | 3.1 | 3 |
| Natural Gas | 6.6 | 6.6 | 6.8 | 7 | 6.8 |
| Propane | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 |
| Light Fuel Oil and Kerosene | 1.4 | 1.3 | 1.3 | 1.2 | 1.1 |
| Heavy Fuel Oil | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Other | 0 | 0 | 0 | 0 | 0 |
| **Activity** | | | | | |
| Floor Space (million m²) [b] | 8.85 | 8.87 | 8.87 | 8.83 | 8.89 |
| **Energy Intensity (GJ/m²) [b,c]** | **1.32** | **1.3** | **1.33** | **1.34** | **1.31** |

**Sources:**

b) Informetrica Limited, *TIM/RIM Database and Historical Estimates of Commercial Floor Space*,1998 Database Update, Ottawa, January 2001.

c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **133.2** | **139** | **148.1** | **126.6** | **132.2** | **147.8** | **24.2%** |
| 34.8 | 36.2 | 37.6 | 34 | 34.3 | 36.5 | 17.0% |
| 74.9 | 81.6 | 79.8 | 73.8 | 77.5 | 87.5 | 23.8% |
| 9.1 | 7.2 | 8.4 | 6 | 7.4 | 7.6 | 204.0% |
| 12.6 | 12.1 | 11.8 | 9.4 | 9.6 | 12.2 | 0.0% |
| 1.6 | 1.8 | 2.4 | 3.3 | 3.3 | 3.8 | 65.2% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0% |
| 74.32 | 75.86 | 77.27 | 78.16 | 80.59 | 85.73 | 28.2% |
| **1.79** | **1.83** | **1.81** | **1.62** | **1.64** | **1.72** | **-3.4%** |
| **115.9** | **119.2** | **129.9** | **113.3** | **117.7** | **124.8** | **17.6%** |
| 36.1 | 36.9 | 38 | 36.3 | 36.7 | 37.6 | 12.6% |
| 62.1 | 66.6 | 66.1 | 62.2 | 65.7 | 68.5 | 19.1% |
| 4.8 | 3.7 | 4.3 | 3.1 | 3.5 | 3.6 | 125.0% |
| 11.1 | 9.9 | 9.8 | 8 | 8.1 | 11 | -3.5% |
| 1.8 | 2 | 2.6 | 3.6 | 3.7 | 3.9 | 85.7% |
| 0 | 0 | 0.1 | 0 | 0 | 0.1 | – |
| 35.25 | 35.71 | 36.35 | 36.68 | 37.82 | 39.15 | 19.5% |
| **3.29** | **3.34** | **3.32** | **3.09** | **3.11** | **3.19** | **-1.9%** |
| **11.8** | **12.1** | **12** | **10.9** | **11.4** | **12** | **3.4%** |
| 3.1 | 3.2 | 3.3 | 3 | 3 | 3.1 | -3.1% |
| 6.8 | 7.1 | 6.9 | 6.2 | 6.7 | 7 | 6.1% |
| 0.5 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 100.0% |
| 1.2 | 1.2 | 1.2 | 1 | 1 | 1.2 | -14.3% |
| 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 100.0% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 8.9 | 8.9 | 8.66 | 8.95 | 9.23 | 9.31 | 5.2% |
| **1.32** | **1.36** | **1.35** | **1.22** | **1.24** | **1.29** | **-2.3%** |

*continued*

## Commercial Energy Use by Building Type and Fuel Type *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Energy Use by Other Institutions (PJ)** [c] | **33.6** | **35.3** | **36** | **38.2** | **38.1** |
| ***Energy Use by Fuel Type (PJ)*** [c] | | | | | |
| Electricity | 9.8 | 10.4 | 10.5 | 10.9 | 11.1 |
| Natural Gas | 19.7 | 20.9 | 21.4 | 22.9 | 22.4 |
| Propane | 0.6 | 0.7 | 0.8 | 1 | 1.5 |
| Light Fuel Oil and Kerosene | 3 | 2.8 | 2.8 | 2.9 | 2.6 |
| Heavy Fuel Oil | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 |
| Other | 0 | 0 | 0 | 0 | 0 |
| **Activity** | | | | | |
| Floor Space (million $m^2$) [b] | 19.8 | 20.81 | 21.52 | 21.95 | 22.7 |
| **Energy Intensity ($GJ/m^2$)** [b,c] | **1.7** | **1.69** | **1.68** | **1.74** | **1.68** |
| **Total Energy Use by Offices (PJ)** [c] | **189.8** | **197.5** | **203.2** | **210.7** | **212.6** |
| ***Energy Use by Fuel Type (PJ)*** [c] | | | | | |
| Electricity | 89.1 | 93.4 | 93.6 | 97.4 | 99.1 |
| Natural Gas | 81.8 | 85.8 | 90.8 | 93.1 | 92.2 |
| Propane | 3.5 | 3.9 | 4.2 | 5.2 | 7 |
| Light Fuel Oil and Kerosene | 12.8 | 12 | 12.1 | 12.5 | 11.6 |
| Heavy Fuel Oil | 2.5 | 2.5 | 2.4 | 2.4 | 2.6 |
| Other | 0.1 | 0 | 0 | 0.1 | 0.1 |
| **Activity** | | | | | |
| Floor Space (million $m^2$) [b] | 121.11 | 128.12 | 133.34 | 137.13 | 139.07 |
| **Energy Intensity ($GJ/m^2$)** [b,c] | **1.57** | **1.54** | **1.52** | **1.54** | **1.53** |
| **Total Energy Use by Retail Organizations (PJ)** [c] | **220.6** | **224.3** | **221.6** | **229** | **226.3** |
| ***Energy Use by Fuel Type (PJ)*** [c] | | | | | |
| Electricity | 128.7 | 130.5 | 126.2 | 129.8 | 129.5 |
| Natural Gas | 77.6 | 79.6 | 81.4 | 84.5 | 80.3 |
| Propane | 3 | 3.4 | 3.5 | 4.4 | 7 |
| Light Fuel Oil and Kerosene | 9.3 | 8.7 | 8.5 | 8.4 | 7.5 |
| Heavy Fuel Oil | 1.9 | 2 | 2 | 1.9 | 1.8 |
| Other | 0.1 | 0 | 0 | 0.1 | 0.1 |
| **Activity** | | | | | |
| Floor Space (million $m^2$) [b] | 110.31 | 111.95 | 112.94 | 113.73 | 113.65 |
| **Energy Intensity ($GJ/m^2$)** [b,c] | **2** | **2** | **1.96** | **2.01** | **1.99** |

**Sources:**

b) Informetrica Limited, *TIM/RIM Database and Historical Estimates of Commercial Floor Space*,1998 Database Update, Ottawa, January 2001.

c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.

continued

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **40.5** | **42.5** | **42.9** | **39.4** | **41.4** | **44** | **31.9%** |
| 12 | 12.4 | 12.9 | 12.5 | 12.5 | 12.7 | 29.6% |
| 23.2 | 25 | 24.9 | 22.3 | 24.1 | 25.8 | 31.0% |
| 1.7 | 1.4 | 1.5 | 1.2 | 1.3 | 1.4 | 133.3% |
| 3.1 | 3.2 | 3 | 2.4 | 2.5 | 3 | 0.0% |
| 0.4 | 0.4 | 0.6 | 0.9 | 1 | 1 | 100.0% |
| 0 | 0 | 0 | 0 | 0 | 0.1 | – |
| 23.59 | 24.27 | 24.93 | 25.2 | 25.98 | 26.89 | 35.8% |
| **1.71** | **1.75** | **1.72** | **1.58** | **1.59** | **1.64** | **-3.9%** |
| **222.6** | **229.8** | **239.7** | **224.7** | **234.8** | **261.2** | **37.9%** |
| 103.5 | 106 | 110.1 | 108.2 | 110.3 | 117.8 | 32.2% |
| 95.7 | 100.8 | 104.8 | 95.2 | 102.1 | 116.9 | 42.9% |
| 8.8 | 7.9 | 9.2 | 7.2 | 8.5 | 9 | 157.1% |
| 12.5 | 13.2 | 12.9 | 10.6 | 10.3 | 13 | 1.6% |
| 1.9 | 1.8 | 2.4 | 3.4 | 3.3 | 4.3 | 72.0% |
| 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.3 | 200.0% |
| 140.38 | 141.8 | 145.31 | 148.08 | 152.66 | 165.87 | 37.0% |
| **1.59** | **1.62** | **1.65** | **1.52** | **1.54** | **1.57** | **9.6%** |
| **230.7** | **229.7** | **231.9** | **227.7** | **234.1** | **254.4** | **15.3%** |
| 130.3 | 129.5 | 130.9 | 133.7 | 135.4 | 141.6 | 10.0% |
| 81.3 | 84.2 | 84.4 | 79.1 | 83.3 | 93.9 | 21.0% |
| 8.5 | 6.7 | 7.7 | 6 | 6.8 | 7.2 | 140.0% |
| 9.2 | 8 | 7.2 | 6.3 | 6 | 8.2 | -11.8% |
| 1.3 | 1.2 | 1.6 | 2.6 | 2.5 | 3.2 | 68.4% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 100.0% |
| 112.86 | 112.43 | 113.12 | 115.96 | 119.56 | 129.34 | 17.3% |
| **2.04** | **2.04** | **2.05** | **1.98** | **1.98** | **1.97** | **-1.5%** |

continued

## Commercial Energy Use by Building Type and Fuel Type *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Energy Use by Hotels and Restaurants (PJ) [c]** | **76.8** | **80.9** | **78** | **83** | **83.8** |
| ***Energy Use by Fuel Type (PJ)*** [c] | | | | | |
| Electricity | 40.5 | 41.3 | 40.6 | 43.1 | 43.5 |
| Natural Gas | 28.5 | 30.8 | 30.7 | 31.8 | 31.6 |
| Propane | 3.1 | 4 | 3.2 | 3.7 | 4.4 |
| Light Fuel Oil and Kerosene | 4 | 4 | 3.7 | 3.7 | 3.4 |
| Heavy Fuel Oil | 0.7 | 0.9 | 0.8 | 0.8 | 0.8 |
| Other | 0 | 0 | 0 | 0 | 0 |
| **Activity** | | | | | |
| Floor Space (million $m^2$) [b] | 26.14 | 27.13 | 27.57 | 28.28 | 28.61 |
| **Energy Intensity ($GJ/m^2$) [b,c]** | **2.94** | **2.98** | **2.86** | **2.94** | **2.93** |
| **Total Energy Use by Recreational Facilities (PJ) [c]** | **49** | **50.6** | **53.6** | **56.2** | **56.6** |
| ***Energy Use by Fuel Type (PJ)*** [c] | | | | | |
| Electricity | 20.8 | 21.4 | 22.9 | 23.3 | 23.6 |
| Natural Gas | 22.9 | 24.2 | 25.5 | 27.1 | 27 |
| Propane | 0.7 | 0.7 | 0.8 | 1.1 | 1.6 |
| Light Fuel Oil and Kerosene | 4.1 | 3.8 | 3.5 | 4.2 | 3.8 |
| Heavy Fuel Oil | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 |
| Other | 0 | 0 | 0 | 0 | 0 |
| **Activity** | | | | | |
| Floor Space (million $m^2$) [b] | 25.91 | 27.11 | 28.31 | 29.37 | 30.21 |
| **Energy Intensity ($GJ/m^2$) [b,c]** | **1.89** | **1.87** | **1.89** | **1.91** | **1.87** |
| **Total Energy Use by Warehouses (PJ) [c]** | **51.7** | **51.5** | **51.8** | **52.7** | **50.9** |
| ***Energy Use by Fuel Type (PJ)*** [c] | | | | | |
| Electricity | 24.5 | 24.1 | 24.1 | 23.8 | 23.4 |
| Natural Gas | 21.9 | 22.5 | 22.7 | 23.7 | 22.5 |
| Propane | 0.8 | 0.8 | 0.9 | 1.2 | 1.5 |
| Light Fuel Oil and Kerosene | 3.6 | 3.4 | 3.3 | 3.3 | 2.9 |
| Heavy Fuel Oil | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 |
| Other | 0 | 0 | 0 | 0 | 0 |
| **Activity** | | | | | |
| Floor Space (million $m^2$) [b] | 54.14 | 54.1 | 53.79 | 53.28 | 52.64 |
| **Energy Intensity ($GJ/m^2$) [b,c]** | **0.95** | **0.95** | **0.96** | **0.99** | **0.96** |

**Sources:**

b) Informetrica Limited, *TIM/RIM Database and Historical Estimates of Commercial Floor Space*,1998 Database Update, Ottawa, January 2001.

c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.

continued

| 1996 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **85.5** | **86.1** | **87.7** | **86.3** | **88.6** | **90.2** | **17.4%** |
| | | | | | | |
| 44.3 | 45.2 | 45.7 | 47.4 | 47.8 | 46.5 | 14.8% |
| 32.1 | 32.5 | 32.9 | 31.4 | 33 | 34.8 | 22.1% |
| 4.8 | 3.9 | 4.4 | 3.1 | 3.5 | 3.6 | 16.1% |
| 3.7 | 3.8 | 3.8 | 3.3 | 3.1 | 3.9 | -2.5% |
| 0.6 | 0.6 | 0.8 | 1.1 | 1.1 | 1.4 | 100.0% |
| 0 | 0 | 0 | 0 | 0 | 0.1 | – |
| | | | | | | |
| 28.78 | 29.14 | 29.46 | 29.82 | 30.74 | 31.78 | 21.6% |
| **2.97** | **2.95** | **2.98** | **2.9** | **2.88** | **2.84** | **-3.4%** |
| | | | | | | |
| **60.9** | **63.5** | **64.4** | **59.4** | **61.3** | **64.5** | **31.8%** |
| | | | | | | |
| 25.4 | 26.3 | 27.2 | 25.9 | 26.3 | 26.8 | 28.8% |
| 28.6 | 30 | 30 | 27.3 | 28.6 | 30.3 | 32.3% |
| 1.9 | 1.6 | 1.8 | 1.4 | 1.6 | 1.7 | 142.9% |
| 4.7 | 5.1 | 4.9 | 4.1 | 4.1 | 4.8 | 17.1% |
| 0.3 | 0.4 | 0.5 | 0.7 | 0.7 | 0.8 | 60.0% |
| 0 | 0 | 0 | 0 | 0 | 0.1 | – |
| | | | | | | |
| 31.86 | 32.95 | 33.52 | 33.79 | 34.83 | 35.16 | 35.7% |
| **1.91** | **1.93** | **1.92** | **1.76** | **1.76** | **1.83** | **-8.2%** |
| | | | | | | |
| **52.1** | **52.3** | **51.4** | **48.4** | **50.5** | **52.6** | **1.7%** |
| | | | | | | |
| 23.9 | 23.7 | 23.5 | 22.8 | 23 | 23.3 | -4.9% |
| 22.9 | 23.5 | 22.8 | 21 | 22.7 | 23.8 | 8.7% |
| 1.7 | 1.4 | 1.5 | 1.2 | 1.3 | 1.5 | 87.5% |
| 3.1 | 3.2 | 2.9 | 2.4 | 2.4 | 3 | -21.1% |
| 0.5 | 0.5 | 0.7 | 1 | 1 | 1 | 42.9% |
| 0 | 0 | 0 | 0 | 0 | 0.1 | – |
| | | | | | | |
| 52.85 | 52.41 | 51.61 | 52.78 | 54.41 | 54.91 | 1.4% |
| **0.99** | **1** | **1** | **0.92** | **0.93** | **0.96** | **1.1%** |

## Commercial GHG Emissions by Fuel Type, End-Use and Building Type

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total GHG Emissions including Electricity (Mt)** [a,g] | **47.8** | **47.9** | **51.2** | **48.5** | **47.4** |
| ***GHG Emissions by Fuel Type (Mt)*** [a,g] | | | | | |
| Electricity | 21.9 | 21.4 | 24.1 | 20.4 | 19.9 |
| Natural Gas | 19.5 | 20.3 | 20.9 | 21.7 | 20.7 |
| Propane | 1 | 1.1 | 1.1 | 1.4 | 2 |
| Light Fuel Oil and Kerosene | 4.6 | 4.3 | 4.2 | 4.2 | 3.9 |
| Heavy Fuel Oil | 0.8 | 0.8 | 0.9 | 0.8 | 0.9 |
| Other | 0 | 0 | 0 | 0 | 0 |
| ***GHG Emissions by End-Use (Mt)*** [c,g] | | | | | |
| Lighting | 7.1 | 6.9 | 7.9 | 6.6 | 6.5 |
| Space Cooling | 2.2 | 2.7 | 1.7 | 2 | 2.1 |
| Auxiliary Motors | 5.8 | 5.7 | 6.4 | 5.4 | 5.3 |
| Auxiliary Equipment | 3.7 | 3.7 | 4 | 3.5 | 3.4 |
| Space Heating | 23.4 | 23.5 | 25.5 | 25.6 | 24.7 |
| Water Heating | 5 | 5 | 5 | 5 | 5 |
| Street Lighting | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| ***GHG Emissions by Building Type (Mt)**** [c,g] | | | | | |
| Schools | 6.5 | 6.6 | 7 | 6.9 | 6.6 |
| Health Care Institutions | 5.9 | 5.8 | 6.2 | 6 | 5.8 |
| Religious Institutions | 0.6 | 0.6 | 0.7 | 0.6 | 0.6 |
| Other Institutions | 1.8 | 1.9 | 2 | 2 | 2 |
| Offices | 10.5 | 10.6 | 11.6 | 10.9 | 10.6 |
| Retail Organizations | 12.1 | 12 | 12.7 | 11.7 | 11.4 |
| Hotels and Restaurants | 4.2 | 4.4 | 4.5 | 4.3 | 4.3 |
| Recreational Facilities | 2.7 | 2.7 | 3 | 2.9 | 2.9 |
| Warehouses | 2.9 | 2.8 | 3 | 2.7 | 2.6 |
| **GHG Intensity (tonne/TJ)** [a,g] | **55.09** | **53.87** | **56.84** | **51.96** | **51.09** |

* Excludes street lighting.

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.

f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.

g) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990-2000 |
|---|---|---|---|---|---|---|
| 50.4 | 50.5 | 53.8 | 53.9 | 54.9 | 59.9 | 25.2% |
| | | | | | | |
| 21.3 | 20.9 | 23.7 | 26.5 | 25.7 | 27.3 | 24.7% |
| 21.4 | 22.5 | 22.6 | 20.9 | 22.1 | 24.5 | 25.6% |
| 2.5 | 2.1 | 2.4 | 1.8 | 2.1 | 2.2 | 120.0% |
| 4.5 | 4.4 | 4.2 | 3.5 | 3.5 | 4.4 | -4.3% |
| 0.6 | 0.7 | 0.9 | 1.2 | 1.2 | 1.4 | 75.0% |
| 0 | 0 | 0 | 0 | 0 | 0.1 | - |
| | | | | | | |
| 6.7 | 6.5 | 7.4 | 8.5 | 8.3 | 9.1 | 28.2% |
| 2.4 | 2.2 | 2.4 | 3.7 | 3.6 | 2.7 | 22.7% |
| 5.5 | 5.3 | 6 | 6.9 | 6.7 | 7.3 | 25.9% |
| 3.5 | 3.4 | 3.9 | 4.4 | 4.3 | 4.7 | 27.0% |
| 26.7 | 27.7 | 28.6 | 24.8 | 26 | 30.1 | 28.6% |
| 5.1 | 5 | 5.1 | 5.2 | 5.2 | 5.6 | 12.0% |
| 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | -20.0% |
| | | | | | | |
| 7.1 | 7.3 | 7.6 | 7.1 | 7.3 | 8.2 | 26.2% |
| 6.2 | 6.2 | 6.5 | 6.4 | 6.5 | 7 | 18.6% |
| 0.6 | 0.6 | 0.7 | 0.6 | 0.6 | 0.7 | 16.7% |
| 2.1 | 2.2 | 2.3 | 2.2 | 2.3 | 2.4 | 33.3% |
| 11.6 | 11.8 | 12.9 | 12.9 | 13.1 | 14.8 | 41.0% |
| 11.9 | 11.6 | 12.4 | 13.2 | 13.2 | 14.5 | 19.8% |
| 4.5 | 4.4 | 4.7 | 5 | 5 | 5.2 | 23.8% |
| 3.2 | 3.3 | 3.5 | 3.4 | 3.4 | 3.7 | 37.0% |
| 2.7 | 2.7 | 2.8 | 2.8 | 2.8 | 3 | 3.4% |
| | | | | | | |
| 52.41 | 51.47 | 53.85 | 57.99 | 56.78 | 58.58 | 2.7% |

## Commercial GHG Emissions by Fuel Type, End-Use and Building Type *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total GHG Emissions Excluding Electricity (Mt)** [a,g] | **25.9** | **26.5** | **27.1** | **26.1** | **27.5** |
| ***GHG Emissions by End-Use (Mt)*** [c,f,g] | | | | | |
| Lighting | 0 | 0 | 0 | 0 | 0 |
| Space Cooling | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 |
| Auxiliary Motors | 0 | 0 | 0 | 0 | 0 |
| Auxiliary Equipment | 0.6 | 0.8 | 0.7 | 0.6 | 0.6 |
| Space Heating | 20.5 | 20.8 | 21.6 | 22.6 | 21.9 |
| Water Heating | 4.7 | 4.8 | 4.7 | 4.8 | 4.8 |
| Street Lighting | 0 | 0 | 0 | 0 | 0 |
| ***GHG Emissions by Building Type (Mt)**** [c,f,g] | | | | | |
| Schools | 4.8 | 4.9 | 5 | 5.2 | 5 |
| Health Care Institutions | 4 | 4 | 4.1 | 4.2 | 4.1 |
| Religious Institutions | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Other Institutions | 1.3 | 1.3 | 1.4 | 1.5 | 1.4 |
| Offices | 5.5 | 5.8 | 5.9 | 6.1 | 6 |
| Retail Organizations | 4.9 | 5 | 5.1 | 5.2 | 5.1 |
| Hotels and Restaurants | 2 | 2.1 | 2.1 | 2.1 | 2.1 |
| Recreational Facilities | 1.5 | 1.6 | 1.7 | 1.8 | 1.7 |
| Warehouses | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| **GHG Intensity (tonne/TJ)** [a,g] | **29.86** | **29.81** | **30.06** | **30.15** | **29.63** |

* Excludes street lighting.

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

c) Natural Resources Canada, Commercial End-Use Model, Ottawa, February 2002.

f) Statistics Canada, *Electric Power Generation, Transmission and Distribution, 1999*, Ottawa, July 2001, (Cat. No. 57-202). Data for 2000 estimated by Natural Resources Canada.

g) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | continued<br>Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **29** | **29.7** | **30.1** | **27.4** | **28.9** | **32.8** | **25.9%** |
| | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.4 | 300.0% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 16.7% |
| 23.3 | 24 | 24.3 | 21.5 | 22.9 | 26.3 | 28.3% |
| 4.8 | 4.8 | 4.8 | 4.9 | 4.9 | 5.2 | 10.6% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| | | | | | | |
| 5.3 | 5.5 | 5.5 | 5 | 5.3 | 6 | 25.0% |
| 4.3 | 4.4 | 4.5 | 4.1 | 4.4 | 4.8 | 20.0% |
| 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 0.0% |
| 1.5 | 1.6 | 1.6 | 1.4 | 1.5 | 1.7 | 30.8% |
| 6.4 | 6.6 | 6.9 | 6.2 | 6.6 | 7.7 | 40.0% |
| 5.4 | 5.3 | 5.3 | 5 | 5.2 | 6 | 22.4% |
| 2.2 | 2.2 | 2.2 | 2.1 | 2.2 | 2.4 | 20.0% |
| 1.9 | 2 | 2 | 1.8 | 1.9 | 2 | 33.3% |
| 1.5 | 1.5 | 1.5 | 1.4 | 1.5 | 1.6 | 6.7% |
| | | | | | | |
| **30.22** | **30.22** | **30.11** | **29** | **29.53** | **30.77** | **3.8%** |

# Chapter 4 Industrial Sector

## The Data Situation

The aggregate energy use data presented in this report are taken from Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada* (QRESD) (Cat. No. 57-003). The QRESD is Canada's official energy supply and demand balance. It is also the basis of Canada's inventory of greenhouse gases that is produced by Environment Canada.

Traditionally, QRESD data were estimated from a suite of Statistics Canada surveys of energy distributors and end-users. Up to 1993, most of the data were estimated from supply sources. As of 1994, the *Industrial Consumption of Energy* (ICE) Survey, one of the sources of end-use data for the QRESD, has been greatly expanded. The 1995 survey included some 2000 respondents, up from 230 respondents in 1993. As a result of expending the ICE survey, data are now available for 24 industries at the two-digit level (Standard Industrial Classification code) and for 31 sub-industries at the three- and four-digit levels, rather than the previous 10 industries. Environment Canada is now using these data to produce supplementary emissions estimates for these industries.

Natural Resources Canada's (NRCan's) understanding of how energy is used in Canadian industry has improved, as more information from the ICE survey becomes available. As a result of better data and discussions with Statistics Canada, NRCan has changed the industrial energy use data. For example, own use consumption, which had been reported under the petroleum refining industry, is now reported under both the mining industry and the petroleum refining industry. Changes were made to better reflect demand and non-energy feedstock in the chemical industry between 1990 and 1998. Industrial petroleum coke demand in 1996 also needed a correction.

The expanded ICE survey was also used to derive a more disaggregated set of industrial energy use data for the 1990 to 1994 period. The Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC), at Simon Fraser University, has developed a database to track the energy efficiency progress of various industry groups involved in the Canadian Industry Program for Energy Conservation (CIPEC). Because CIPEC required disaggregated data going back to 1990, and the expanded ICE survey is available only since 1994, CIEEDAC has to use a combination of the ICE survey, the *Annual Survey of Manufacturers* data and extensive consultation/work with industries. This database allows NRCan to develop physical measures of activity, when appropriate, and an economic measure of output for the entire 1990 to 2000 period.

The CIEEDAC database contains energy use data by industry and fuel, as well as physical unit of output for some industries. This allows the OEE to expand its database to 53 industries. CIEEDAC energy use data are calibrated to the QRESD energy use data, in NRCan's database.

## Industrial Energy Use and GHG Emissions by Fuel Type

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Energy Use (PJ)** [a] | 2,754.7 | 2,781.0 | 2,723.0 | 2,748.0 | 2,911.5 |
| ***Energy Use by Fuel Type (PJ)*** [a] | | | | | |
| Electricity | 658.4 | 667.6 | 673.4 | 694.7 | 712.7 |
| Natural Gas | 837.2 | 820.7 | 825.5 | 824.6 | 865.6 |
| LPG and Gas Plant NGL | 27 | 28.4 | 31.9 | 33.7 | 30 |
| Coal, Coke and Coke Oven Gas | 176.3 | 183 | 181.9 | 172.1 | 174.2 |
| Heavy Fuel Oil | 201.1 | 179.5 | 160.7 | 162.2 | 160.4 |
| Light Fuel Oil, Diesel Fuel Oil and Kerosene | 126.7 | 118.7 | 107.8 | 114.6 | 127.4 |
| Still Gas and Petroleum Coke | 321.7 | 297.7 | 331.9 | 344.5 | 352.1 |
| Wood Waste and Pulping Liquor | 378.3 | 374.2 | 385.9 | 383 | 462 |
| Other | 27.9 | 31.4 | 24 | 18.5 | 27.1 |
| **Activity** | | | | | |
| GDP (million $86) [b] | 148,193 | 139,281 | 139,142 | 143,878 | 153,047 |
| Gross Output (million $86) [b] | 416,145 | 394,006 | 396,682 | 414,252 | 440,819 |
| **Energy Intensity (MJ/$86 – GDP)** [a,b] | 18.6 | 19.4 | 19.6 | 19.1 | 19 |
| **Energy Intensity (MJ/$86 – GO)** [a,b] | 6.6 | 6.9 | 6.9 | 6.6 | 6.6 |
| **Total GHG Emissions Including Electricity (Mt)** [a,c] | 141.1 | 136 | 141.2 | 135.5 | 138.1 |
| ***GHG Emissions by Fuel Type (Mt)*** [a,c] | | | | | |
| Electricity | 36.9 | 35.9 | 40.9 | 34.7 | 34.6 |
| Natural Gas | 42.1 | 41.3 | 41.4 | 41.3 | 42.7 |
| LPG and Gas Plant NGL | 1.6 | 1.7 | 1.9 | 2 | 1.8 |
| Coal, Coke and Coke Oven Gas | 15.1 | 15.7 | 15.5 | 14.7 | 14.9 |
| Heavy Fuel Oil | 15 | 13.4 | 12 | 12.1 | 12 |
| Light Fuel Oil, Diesel Fuel Oil and Kerosene | 9.4 | 8.8 | 8 | 8.5 | 9.4 |
| Still Gas and Petroleum Coke | 20.9 | 19.3 | 21.5 | 22.3 | 22.7 |
| Wood Waste and Pulping Liquor | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 |
| **GHG Intensity (tonne/TJ)** [a,c] | 51.2 | 50.3 | 51.9 | 49.3 | 47.4 |
| **Total GHG Emissions Excluding Electricity (Mt)** [a,c] | 104.2 | 100.1 | 100.3 | 100.8 | 103.4 |
| **GHG Intensity (tonne/TJ)** [a,c] | 37.8 | 37.1 | 36.8 | 36.7 | 35.5 |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Informetrica Limited, *TIM/RIM Database and National Reference Forecast*, Ottawa, November 2001.

c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **2,973.6** | **3,057.5** | **3,057.2** | **3,004.0** | **3,098.5** | **3,203.5** | **16.3%** |
| | | | | | | |
| 738.4 | 745.2 | 757.6 | 768.7 | 783.8 | 810.8 | 23.1% |
| 898.9 | 948.2 | 953.1 | 897.3 | 907.3 | 966.9 | 15.5% |
| 34.7 | 31.3 | 31.4 | 31.6 | 30.2 | 39.4 | 45.9% |
| 175.9 | 177.1 | 176.8 | 175.8 | 180.7 | 187.1 | 6.1% |
| 147 | 154.2 | 154.4 | 149.4 | 140.8 | 142.9 | -28.9% |
| 128.7 | 148.1 | 148.2 | 134.2 | 136.5 | 145 | 14.4% |
| 357.1 | 363.9 | 350.5 | 335.6 | 349.5 | 341.6 | 6.2% |
| 460 | 457.8 | 459.1 | 477.3 | 531.1 | 530.9 | 40.3% |
| 32.9 | 31.6 | 26.1 | 34.2 | 38.6 | 38.9 | 39.4% |
| | | | | | | |
| 156,389 | 157,836 | 166,424 | 171,332 | 180,944 | 193,886 | 30.8% |
| 452,217 | 459,884 | 472,930 | 505,466 | 541,080 | 572,084 | 37.5% |
| | | | | | | |
| **19** | **19.4** | **18.4** | **17.5** | **17.1** | **16.5** | **-11.3%** |
| **6.6** | **6.6** | **6.5** | **5.9** | **5.7** | **5.6** | **-15.2%** |
| | | | | | | |
| **143.2** | **146.8** | **150.8** | **152.3** | **152.1** | **159.3** | **12.9%** |
| | | | | | | |
| 37.4 | 36.4 | 41.1 | 47.3 | 46.1 | 49.9 | 32.5% |
| 44.9 | 47.3 | 47.6 | 44.7 | 45.3 | 48.4 | 15.0% |
| 2 | 1.8 | 1.8 | 1.9 | 1.8 | 2.3 | 43.8% |
| 15 | 15.1 | 15.1 | 15 | 15.4 | 15.8 | 4.6% |
| 11 | 11.5 | 11.5 | 10.9 | 10.3 | 10.5 | -30.0% |
| 9.5 | 10.9 | 10.9 | 10 | 10.2 | 10.8 | 14.9% |
| 23.4 | 23.7 | 22.7 | 22.6 | 23 | 22.6 | 8.1% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| | | | | | | |
| **48.2** | **48** | **49.3** | **58.7** | **49.1** | **49.7** | **-2.9%** |
| | | | | | | |
| **105.8** | **110.4** | **109.7** | **105.1** | **105.9** | **110.4** | **6.9%** |
| | | | | | | |
| **35.8** | **36.1** | **35.9** | **35** | **34.2** | **34.5** | **-8.7%** |

## Industrial Energy Use by Industry

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Energy Use (PJ)** [a] | 2,754.7 | 2,781.8 | 2,723.8 | 2,748.8 | 2,911.5 |
| ***Energy Use by Industry (PJ)*** [a,d] | | | | | |
| Gold Mines | 13.1 | 13.1 | 11.7 | 11.4 | 11.3 |
| Copper, Copper-Zinc and Nickel-Copper Mines | 27.6 | 27.4 | 24.5 | 23 | 21 |
| Silver-Lead-Zinc Mines | 7.6 | 7.1 | 8.1 | 5 | 4.6 |
| Iron Mines | 36.3 | 32.6 | 29.3 | 28.9 | 35 |
| Other Metal Mines | 9.1 | 6.5 | 5.2 | 4.5 | 5.3 |
| Peat Industry | 0.7 | 0.8 | 0.5 | 0.5 | 0.7 |
| Gypsum Mines | 0.6 | 0.5 | 0.5 | 0.6 | 0.5 |
| Potash Mines | 27.4 | 27.4 | 25.8 | 25.7 | 31 |
| Salt Mines | 2.9 | 3.1 | 3.2 | 3.5 | 4.2 |
| Other Non-Metal Mines | 7.9 | 7.4 | 6.5 | 6.6 | 6.5 |
| Upstream Mining | 210.4 | 201.3 | 223.3 | 297 | 295.6 |
| Construction | 66.9 | 57.9 | 57.6 | 50.7 | 54 |
| Forestry | 7.7 | 6.5 | 7.4 | 7.9 | 7.5 |
| Pulp Industry | 357.2 | 370.3 | 373.8 | 376.6 | 420.3 |
| Newsprint Industry | 263.8 | 259.9 | 261.3 | 253.6 | 291.6 |
| Paperboard Industry | 58 | 59.2 | 58.3 | 60.7 | 64.8 |
| Building Board Industry | 2.5 | 2.6 | 3.2 | 3.3 | 4.2 |
| Other Paper Industries | 103.2 | 87.2 | 83.4 | 88.4 | 85.2 |
| Primary Production of Aluminum | 113.8 | 133 | 140.2 | 156.7 | 153.3 |
| Other Non-Ferrous Smelting and Refining | 69.5 | 55.5 | 57.8 | 54.1 | 69.4 |
| Petroleum Refining | 334.9 | 314 | 321.5 | 325 | 317.3 |
| Cement Industry | 59.3 | 50.8 | 50.8 | 51.1 | 59.2 |
| Industrial Inorganic Chemicals Industries | 74.1 | 77 | 71.9 | 72.5 | 72.4 |
| Industrial Organic Chemicals Industries | 115.6 | 117.8 | 111.7 | 88.3 | 119.8 |
| Chemical Fertilizers and Fertilizer Materials Industries | 33.5 | 37.7 | 38.9 | 50.4 | 49.9 |
| Iron and Steel | 219.4 | 235 | 244.9 | 241.9 | 250.3 |
| Meat and Poultry Products Industries | 15.4 | 15.5 | 13.3 | 14.6 | 17.9 |
| Fruit and Vegetable Industries | 9.5 | 9.6 | 8.1 | 9.4 | 10.5 |
| Bakery Products Industries | 5.7 | 5.7 | 5.4 | 5.6 | 6.3 |
| Other Food Industries | 43.1 | 40.2 | 37.7 | 40.1 | 47.4 |
| Dairy Products Industries | 11.9 | 11.4 | 10.8 | 10.3 | 12.1 |
| Beverage Industries (excluding breweries) | 9 | 7.4 | 5.3 | 7 | 7 |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Informetrica Limited, *TIM/RIM Database and National Reference Forecast*, Ottawa, November 2001.

d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990-2000 |
|---|---|---|---|---|---|---|
| 2,973.6 | 3,057.5 | 3,057.2 | 3,084.0 | 3,098.5 | 3,293.5 | 16.9% |
| 12.5 | 15.1 | 14.6 | 11.4 | 13.2 | 12 | -8.4% |
| 23.2 | 22.4 | 21.1 | 20.3 | 16.4 | 19 | -31.2% |
| 5.5 | 6.5 | 5.8 | 5.3 | 4.8 | 4.4 | -42.1% |
| 36.2 | 36.3 | 39.5 | 36 | 28.8 | 32.5 | -10.5% |
| 5.5 | 5.5 | 4.9 | 4.3 | 4.2 | 4.9 | -46.2% |
| 0.8 | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 | 28.6% |
| 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0% |
| 31.8 | 31.4 | 32.6 | 31.6 | 32.5 | 22.7 | -17.2% |
| 3.4 | 2.9 | 2.9 | 2.7 | 2.6 | 2.6 | -10.3% |
| 6.2 | 6.2 | 6.9 | 5.8 | 6.8 | 6.4 | -19.0% |
| 318.2 | 345.1 | 344.4 | 336.4 | 347.5 | 384.3 | 82.7% |
| 48.9 | 50.5 | 49.5 | 48 | 50.4 | 49.9 | -25.4% |
| 7.9 | 9.6 | 11.1 | 12.3 | 14.8 | 16.2 | 110.4% |
| 443.2 | 376.7 | 396.4 | 393.5 | 421.1 | 429.1 | 20.1% |
| 289 | 288.3 | 276.4 | 262.2 | 282.8 | 271.5 | 2.9% |
| 72.4 | 73.8 | 76.3 | 78.7 | 81.3 | 71.6 | 23.4% |
| 3.4 | 4.7 | 5.1 | 6.2 | 6.8 | 8 | 220.0% |
| 63.4 | 130.9 | 128.6 | 143.7 | 166.8 | 181 | 75.4% |
| 143 | 151.8 | 156.8 | 159.8 | 166.5 | 147.7 | 29.8% |
| 76.9 | 81.5 | 74.2 | 79.9 | 69.9 | 78.5 | 12.9% |
| 308.4 | 329.5 | 320.9 | 294.6 | 289.3 | 296.6 | -11.4% |
| 61.3 | 58.5 | 57.9 | 63.6 | 66.8 | 66.5 | 12.1% |
| 89.5 | 85.7 | 79.9 | 85 | 84.8 | 81.6 | 10.1% |
| 105.7 | 113 | 108.3 | 91.2 | 95.4 | 99.5 | -13.9% |
| 58 | 56.5 | 57.7 | 65 | 60.2 | 58.3 | 74.0% |
| 247.9 | 252.1 | 251.2 | 254.7 | 259.8 | 257.7 | 17.5% |
| 13.7 | 16 | 15.5 | 15.8 | 17.3 | 18.8 | 22.1% |
| 9.9 | 12.1 | 12.6 | 13.1 | 12.5 | 13.1 | 37.9% |
| 6.5 | 6.8 | 6.2 | 7 | 6.7 | 6.9 | 21.1% |
| 43 | 41.6 | 46.6 | 39 | 38.7 | 42.2 | -2.1% |
| 10.8 | 11.9 | 11.6 | 12.2 | 13.2 | 11.8 | -0.8% |
| 5.4 | 5.4 | 5.9 | 6.7 | 7.4 | 6.8 | -24.4% |

*continued*

## Industrial Energy Use by Industry *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| ***Energy Use by Industry (PJ)*** [a,d] **(continued)** | | | | | |
| Brewery Products Industries | 7.1 | 6.5 | 6.8 | 6.3 | 6.6 |
| Tobacco Products Industries | 1.3 | 1.1 | 1.2 | 1.2 | 1.2 |
| Rubber Products Industries | 9.1 | 8.7 | 9.2 | 9.1 | 8 |
| Plastic Products Industries | 12 | 11.2 | 12.8 | 13.5 | 14.8 |
| Leather and Allied Products Industries | 1.2 | 1.1 | 1.2 | 1.3 | 1.4 |
| Primary Textile Industries | 14.3 | 15.5 | 15.7 | 14.7 | 22.7 |
| Textile Products Industries | 6.7 | 8.6 | 8.5 | 8.9 | 9.1 |
| Clothing Industries | 5.2 | 4.8 | 5.5 | 5.4 | 5.5 |
| Sawmill and Planing Mill Products Industry | 21.1 | 21.2 | 23.3 | 28.2 | 34.4 |
| Other Wood Industries | 16.2 | 13.2 | 15 | 18.4 | 21.6 |
| Furniture and Fixture Industries | 5.2 | 4.2 | 5.5 | 6 | 6.3 |
| Printing, Publishing and Allied Industries | 8.6 | 8.4 | 10.1 | 10.5 | 11.2 |
| Fabricated Metal Products Industries | 27.5 | 25 | 29.1 | 31.7 | 35.7 |
| Machinery Industries | 12.6 | 11.6 | 13.6 | 12.1 | 12.4 |
| Motor Vehicle Industry | 23.5 | 23.7 | 26.6 | 30.5 | 29.3 |
| Motor Vehicle Parts and Accessories Industries | 29 | 26.7 | 25.5 | 27.3 | 29.9 |
| Electrical and Electronic Products Industries | 18.3 | 15.5 | 18 | 16.8 | 16.9 |
| Glass and Glass Products Industries | 12.5 | 11.3 | 13.9 | 14.4 | 15.4 |
| Lime Industry | 14.4 | 12.5 | 12.9 | 13.4 | 14.7 |
| Plastic and Synthetic Resin Industry | 16.1 | 15.7 | 14.2 | 26.5 | 15.8 |
| Other Manufacturing n.e.c. | 175.2 | 173.4 | 152.3 | 76.7 | 62.1 |
| **Activity** | | | | | |
| GDP (million $86) [b] | 148,193 | 139,281 | 139,142 | 143,878 | 153,047 |
| Gross Output (million $86) [b] | 416,145 | 394,006 | 396,682 | 414,252 | 440,819 |
| **Energy Intensity (MJ/$86 – GDP)** [a,b] | **18.6** | **19.4** | **19.6** | **19.1** | **19** |
| **Energy Intensity (MJ/$86 – GO)** [a,b] | **6.6** | **6.9** | **6.9** | **6.6** | **6.6** |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Informetrica Limited, *TIM/RIM Database and National Reference Forecast*, Ottawa, November 2001.

d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

continued

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| 6.2 | 5.7 | 5.9 | 5.6 | 5.8 | 5.8 | -18.3% |
| 1 | 1.2 | 1.1 | 1 | 1 | 1 | -23.1% |
| 9.1 | 10.7 | 10.1 | 10.8 | 11.2 | 11.6 | 27.5% |
| 13.8 | 14.5 | 15.6 | 16.9 | 15 | 16.6 | 38.3% |
| 1 | 1.1 | 1.2 | 1.2 | 1.1 | 1.1 | -8.3% |
| 18.2 | 12.8 | 14 | 13.1 | 13.7 | 13.7 | -4.2% |
| 9.6 | 9.5 | 9.1 | 8.1 | 8.1 | 9 | 34.3% |
| 5.5 | 4.8 | 5 | 5.3 | 4.8 | 5.4 | 3.8% |
| 38 | 40.2 | 40.2 | 40.6 | 38.9 | 40.2 | 90.5% |
| 20.9 | 21.5 | 26.2 | 28.2 | 29.2 | 29.1 | 79.6% |
| 6.6 | 6 | 6.3 | 5.9 | 6.1 | 6.8 | 30.8% |
| 10.9 | 8.4 | 9.5 | 10.5 | 10.9 | 11.7 | 36.0% |
| 38.2 | 38.9 | 41.4 | 39.1 | 33.8 | 38.3 | 39.3% |
| 12.4 | 13.8 | 15.2 | 14.6 | 13 | 13.1 | 4.0% |
| 29.7 | 31.9 | 32 | 28.6 | 33 | 33.5 | 42.6% |
| 30 | 32.2 | 31.7 | 29.2 | 32.1 | 35.5 | 22.4% |
| 15.4 | 16.7 | 15.5 | 15.3 | 17.3 | 18.1 | -1.1% |
| 13.8 | 13.4 | 11 | 10.4 | 12 | 11.5 | -8.0% |
| 15.7 | 15.6 | 16.1 | 15.8 | 16.8 | 16.2 | 12.5% |
| 30.7 | 18.9 | 20.4 | 22.3 | 23.3 | 26.1 | 62.1% |
| 95.1 | 109.9 | 106.9 | 93.8 | 100.5 | 155.9 | -11.1% |
| 156,389 | 157,836 | 166,424 | 171,332 | 180,944 | 193,886 | 30.8% |
| 452,217 | 459,884 | 472,930 | 505,466 | 541,080 | 572,084 | 37.5% |
| 19 | 19.4 | 18.4 | 17.5 | 17.1 | 16.5 | -11.3% |
| 6.6 | 6.6 | 6.5 | 5.9 | 5.7 | 5.6 | -15.2% |

## Industrial GHG Emissions by Industry — Including Electricity-Related Emissions*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total GHG Emissions Including Electricity (Mt)** ** | 141.1 | 136 | 141.2 | 135.5 | 138.1 |
| ***GHG Emissions by Industry (Mt)*** *** | | | | | |
| Gold Mines | 0.8 | 0.8 | 0.7 | 0.6 | 0.6 |
| Copper, Copper-Zinc and Nickel-Copper Mines | 1.6 | 1.6 | 1.5 | 1.3 | 1.1 |
| Silver-Lead-Zinc Mines | 0.5 | 0.5 | 0.6 | 0.3 | 0.3 |
| Iron Mines | 2.5 | 2.2 | 2.1 | 1.9 | 2.3 |
| Other Metal Mines | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 |
| Peat Industry | 0 | 0 | 0 | 0 | 0 |
| Gypsum Mines | 0 | 0 | 0 | 0 | 0 |
| Potash Mines | 1.4 | 1.4 | 1.4 | 1.3 | 1.6 |
| Salt Mines | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Other Non-Metal Mines | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 |
| Upstream Mining | 13 | 12.5 | 14 | 17.3 | 17.4 |
| Construction | 4.4 | 3.8 | 3.7 | 3.3 | 3.5 |
| Forestry | 0.6 | 0.5 | 0.6 | 0.6 | 0.6 |
| Pulp Industry | 6.4 | 6.4 | 6.3 | 6.2 | 6.5 |
| Newsprint Industry | 11.5 | 10.7 | 10.9 | 9.3 | 10.4 |
| Paperboard Industry | 2 | 2 | 2 | 2.1 | 2.1 |
| Building Board Industry | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 |
| Other Paper Industries | 4 | 4 | 3.9 | 3.9 | 2.3 |
| Primary Production of Aluminum | 6.4 | 7.2 | 8.5 | 7.9 | 7.6 |
| Other Non-Ferrous Smelting and Refining | 4.3 | 3.4 | 3.8 | 3.2 | 4 |
| Petroleum Refining | 20.7 | 19.5 | 20.1 | 20.3 | 19.5 |
| Cement Industry | 4.2 | 3.6 | 3.6 | 3.5 | 4 |
| Industrial Inorganic Chemicals Industries | 3.8 | 3.7 | 3.9 | 3.5 | 3.5 |
| Industrial Organic Chemicals Industries | 5.3 | 5.2 | 5.3 | 4.2 | 5.6 |
| Chemical Fertilizers and Fertilizer Materials Industries | 1.7 | 1.9 | 2 | 2.5 | 2.5 |
| Iron and Steel | 15.9 | 17 | 17.7 | 17 | 17.2 |
| Meat and Poultry Products Industries | 0.8 | 0.8 | 0.7 | 0.7 | 0.9 |
| Fruit and Vegetable Industries | 0.5 | 0.6 | 0.5 | 0.5 | 0.6 |
| Bakery Products Industries | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Other Food Industries | 2.3 | 2.1 | 2.1 | 2.1 | 2.4 |
| Dairy Products Industries | 0.7 | 0.6 | 0.6 | 0.5 | 0.6 |
| Beverage Industries (excluding breweries) | 0.5 | 0.4 | 0.3 | 0.4 | 0.4 |

*Includes only end-use energy-related GHG emissions.

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| 143.2 | 146.8 | 150.8 | 152.3 | 152.1 | 159.3 | 12.9% |
| 0.7 | 0.9 | 0.9 | 0.7 | 0.8 | 0.8 | 0.0% |
| 1.3 | 1.2 | 1.2 | 1.3 | 1 | 1.2 | -25.0% |
| 0.3 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | -40.0% |
| 2.4 | 2.4 | 2.7 | 2.6 | 2 | 2.3 | -8.0% |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | -40.0% |
| 0 | 0 | 0 | 0.1 | 0.1 | 0.1 | – |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 1.6 | 1.6 | 1.7 | 1.7 | 1.7 | 1.2 | -14.3% |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | -50.0% |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | -20.0% |
| 19 | 20.2 | 20.6 | 20.8 | 21.4 | 23.6 | 81.5% |
| 3.3 | 3.3 | 3.3 | 3.2 | 3.3 | 3.3 | -25.0% |
| 0.6 | 0.7 | 0.8 | 0.9 | 1.1 | 1.2 | 100.0% |
| 6.9 | 6.1 | 6.7 | 6.6 | 6.8 | 7.7 | 20.3% |
| 10.7 | 10.5 | 11 | 11.4 | 11.5 | 11 | -4.3% |
| 2.3 | 2.3 | 2.4 | 2.6 | 2.6 | 2.3 | 15.0% |
| 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 200.0% |
| 2.1 | 2.9 | 3.1 | 2.9 | 2.9 | 3.3 | -17.5% |
| 7.3 | 7.5 | 8.5 | 9.7 | 9.7 | 8.9 | 39.1% |
| 4.5 | 4.7 | 4.5 | 5.1 | 4.3 | 4.9 | 14.0% |
| 19.4 | 20.6 | 20.1 | 19.2 | 18.3 | 18.9 | -8.7% |
| 4.1 | 3.9 | 4 | 4.2 | 4.4 | 4.3 | 2.4% |
| 4.3 | 3.9 | 4.1 | 4.7 | 4.6 | 4.6 | 21.1% |
| 4.8 | 5.5 | 5.4 | 4.7 | 4.9 | 5 | -5.7% |
| 2.9 | 2.8 | 2.9 | 3.3 | 3 | 2.9 | 70.6% |
| 17.2 | 17.3 | 17.3 | 17.7 | 18.1 | 18 | 13.2% |
| 0.7 | 0.8 | 0.8 | 0.9 | 0.9 | 1 | 25.0% |
| 0.5 | 0.7 | 0.7 | 0.8 | 0.7 | 0.7 | 40.0% |
| 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 33.3% |
| 2.2 | 2 | 2.4 | 2 | 2 | 2.2 | -4.3% |
| 0.6 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.0% |
| 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | -20.0% |

continued

## Industrial GHG Emissions by Industry — Including Electricity-Related Emissions* *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| ***GHG Emissions by Industry (Mt)*** [a,c,d] **(continued)** | | | | | |
| Brewery Products Industries | 0.4 | 0.3 | 0.4 | 0.3 | 0.3 |
| Tobacco Products Industries | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Rubber Products Industries | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 |
| Plastic Products Industries | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 |
| Leather and Allied Products Industries | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Primary Textile Industries | 0.8 | 0.8 | 0.9 | 0.8 | 1.1 |
| Textile Products Industries | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 |
| Clothing Industries | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Sawmill and Planing Mill Products Industry | 1.2 | 1.1 | 1.3 | 1.5 | 1.7 |
| Other Wood Industries | 0.9 | 0.7 | 0.8 | 0.9 | 1.1 |
| Furniture and Fixture Industries | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 |
| Printing, Publishing and Allied Industries | 0.5 | 0.4 | 0.5 | 0.5 | 0.6 |
| Fabricated Metal Products Industries | 1.5 | 1.3 | 1.6 | 1.6 | 1.8 |
| Machinery Industries | 0.7 | 0.6 | 0.8 | 0.6 | 0.6 |
| Motor Vehicle Industry | 1.3 | 1.2 | 1.4 | 1.6 | 1.5 |
| Motor Vehicle Parts and Accessories Industries | 1.6 | 1.4 | 1.4 | 1.4 | 1.5 |
| Electrical and Electronic Products Industries | 1 | 0.8 | 1 | 0.8 | 0.8 |
| Glass and Glass Products Industries | 0.6 | 0.6 | 0.7 | 0.7 | 0.8 |
| Lime Industry | 1 | 0.8 | 0.9 | 0.9 | 1 |
| Plastic and Synthetic Resin Industry | 0.9 | 0.8 | 0.8 | 1.3 | 0.8 |
| Other Manufacturing n.e.c. | 9 | 8.8 | 8 | 4.1 | 3.3 |
| **GHG Intensity (tonne/TJ)** [a,c,d] | **51.2** | **50.3** | **51.9** | **49.3** | **47.4** |

*Includes only end-use energy-related GHG emissions.

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | continued<br>Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | -25.0% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0% |
| 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 40.0% |
| 0.7 | 0.7 | 0.8 | 1 | 0.8 | 0.9 | 50.0% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0% |
| 0.9 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | -12.5% |
| 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 25.0% |
| 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.0% |
| 2 | 2.1 | 2.2 | 2.4 | 2.2 | 2.3 | 91.7% |
| 1.1 | 1.1 | 1.4 | 1.6 | 1.6 | 1.6 | 77.8% |
| 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 33.3% |
| 0.5 | 0.4 | 0.5 | 0.6 | 0.6 | 0.6 | 20.0% |
| 1.9 | 1.9 | 2.1 | 2.1 | 1.8 | 2.1 | 40.0% |
| 0.6 | 0.7 | 0.8 | 0.8 | 0.7 | 0.7 | 0.0% |
| 1.5 | 1.6 | 1.6 | 1.5 | 1.7 | 1.7 | 30.8% |
| 1.6 | 1.6 | 1.7 | 1.6 | 1.7 | 1.9 | 18.8% |
| 0.8 | 0.8 | 0.8 | 0.8 | 0.9 | 1 | 0.0% |
| 0.7 | 0.7 | 0.6 | 0.5 | 0.6 | 0.6 | 0.0% |
| 1.1 | 1.1 | 1.1 | 1.1 | 1.2 | 1.1 | 10.0% |
| 1.4 | 0.8 | 0.8 | 0.9 | 0.9 | 1.1 | 22.2% |
| 5.1 | 5.8 | 5.6 | 4.9 | 5.3 | 8.2 | -8.9% |
| 48.2 | 48 | 49.3 | 50.7 | 48.1 | 49.7 | -2.9% |

## Industrial GHG Emissions by Industry — Excluding Electricity-Related Emissions*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total GHG Emissions Excluding Electricity (Mt)** [a] | 184.2 | 186.1 | 186.3 | 186.8 | 183.4 |
| ***GHG Emissions by Industry (Mt)*** [c,d] | | | | | |
| Gold Mines | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 |
| Copper, Copper-Zinc and Nickel-Copper Mines | 0.6 | 0.6 | 0.5 | 0.5 | 0.4 |
| Silver-Lead-Zinc Mines | 0.3 | 0.3 | 0.4 | 0.2 | 0.2 |
| Iron Mines | 1.8 | 1.5 | 1.3 | 1.3 | 1.7 |
| Other Metal Mines | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 |
| Peat Industry | 0 | 0 | 0 | 0 | 0 |
| Gypsum Mines | 0 | 0 | 0 | 0 | 0 |
| Potash Mines | 1.1 | 1.2 | 1.1 | 1.1 | 1.3 |
| Salt Mines | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 |
| Other Non-Metal Mines | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 |
| Upstream Mining | 10.3 | 9.9 | 10.9 | 14.5 | 14.6 |
| Construction | 4.4 | 3.8 | 3.7 | 3.3 | 3.5 |
| Forestry | 0.6 | 0.5 | 0.6 | 0.6 | 0.6 |
| Pulp Industry | 4.9 | 4.9 | 4.5 | 4.7 | 4.4 |
| Newsprint Industry | 5.9 | 5.5 | 4.9 | 4.7 | 4.8 |
| Paperboard Industry | 1.5 | 1.5 | 1.5 | 1.5 | 1.6 |
| Building Board Industry | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Other Paper Industries | 1.8 | 1.5 | 1.6 | 1.4 | 1.2 |
| Primary Production of Aluminum | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 |
| Other Non-Ferrous Smelting and Refining | 2.5 | 1.8 | 2 | 1.9 | 2.4 |
| Petroleum Refining | 19.6 | 18.4 | 18.6 | 19.2 | 18.4 |
| Cement Industry | 3.8 | 3.3 | 3.3 | 3.2 | 3.6 |
| Industrial Inorganic Chemicals Industries | 1.2 | 1.4 | 1.3 | 1.4 | 1.2 |
| Industrial Organic Chemicals Industries | 4.4 | 4.4 | 4.4 | 3.6 | 5.1 |
| Chemical Fertilizers and Fertilizer Materials Industries | 1.5 | 1.7 | 1.8 | 2.3 | 2.2 |
| Iron and Steel | 14.2 | 15.5 | 15.9 | 15.5 | 15.7 |
| Meat and Poultry Products Industries | 0.6 | 0.6 | 0.5 | 0.5 | 0.7 |
| Fruit and Vegetable Industries | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 |
| Bakery Products Industries | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Other Food Industries | 1.6 | 1.4 | 1.5 | 1.6 | 1.9 |
| Dairy Products Industries | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 |
| Beverage Industries (excluding breweries) | 0.4 | 0.3 | 0.2 | 0.3 | 0.3 |

*Includes only end-use energy-related GHG emissions.

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| 105.8 | 110.4 | 109.7 | 105.1 | 105.9 | 110.4 | 8.9% |
| 0.3 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | -25.0% |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | -16.7% |
| 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | -33.3% |
| 1.7 | 1.7 | 1.9 | 1.7 | 1.3 | 1.5 | -16.7% |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | -33.3% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 1.3 | 1.3 | 1.4 | 1.3 | 1.3 | 0.9 | -18.2% |
| 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0% |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | -25.0% |
| 15.7 | 17 | 16.9 | 16.1 | 17.1 | 18.9 | 83.5% |
| 3.3 | 3.3 | 3.3 | 3.2 | 3.3 | 3.3 | -25.0% |
| 0.6 | 0.7 | 0.8 | 0.9 | 1.1 | 1.2 | 100.0% |
| 4.5 | 3.8 | 4 | 3.7 | 3.6 | 3.9 | -20.4% |
| 4.7 | 4.7 | 4.6 | 3.9 | 3.9 | 3.8 | -35.6% |
| 1.7 | 1.8 | 1.8 | 1.8 | 1.9 | 1.6 | 6.7% |
| 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 100.0% |
| 0.9 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 0.0% |
| 0.7 | 0.8 | 0.8 | 1 | 1 | 0.3 | -62.5% |
| 2.5 | 2.7 | 2.5 | 2.6 | 2.4 | 2.5 | 0.0% |
| 18.5 | 19.7 | 19.1 | 18.1 | 17.2 | 17.8 | -9.2% |
| 3.8 | 3.6 | 3.6 | 3.7 | 4 | 3.9 | 2.6% |
| 1.5 | 1.4 | 1.4 | 1.6 | 1.5 | 1.6 | 33.3% |
| 4.3 | 4.9 | 4.9 | 4.1 | 4.2 | 4.2 | -4.5% |
| 2.6 | 2.5 | 2.6 | 2.9 | 2.7 | 2.5 | 66.7% |
| 15.6 | 15.7 | 15.5 | 15.5 | 15.9 | 15.8 | 11.3% |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.0% |
| 0.4 | 0.6 | 0.6 | 0.6 | 0.5 | 0.6 | 20.0% |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.0% |
| 1.7 | 1.5 | 1.7 | 1.5 | 1.5 | 1.4 | -12.5% |
| 0.4 | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 | 0.0% |
| 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | -25.0% |

continued

## Industrial GHG Emissions by Industry — Excluding Electricity-Related Emissions* *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| ***GHG Emissions by Industry (Mt)*** [a,c,d] **(continued)** | | | | | |
| Brewery Products Industries | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Tobacco Products Industries | 0 | 0 | 0 | 0 | 0 |
| Rubber Products Industries | 0.4 | 0.3 | 0.4 | 0.4 | 0.3 |
| Plastic Products Industries | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Leather and Allied Products Industries | 0 | 0 | 0 | 0 | 0 |
| Primary Textile Industries | 0.5 | 0.6 | 0.6 | 0.5 | 0.9 |
| Textile Products Industries | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 |
| Clothing Industries | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 |
| Sawmill and Planing Mill Products Industry | 0.5 | 0.5 | 0.6 | 0.8 | 1 |
| Other Wood Industries | 0.6 | 0.4 | 0.5 | 0.6 | 0.7 |
| Furniture and Fixture Industries | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 |
| Printing, Publishing and Allied Industries | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 |
| Fabricated Metal Products Industries | 1 | 0.9 | 1 | 1.1 | 1.3 |
| Machinery Industries | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 |
| Motor Vehicle Industry | 0.9 | 0.9 | 1 | 1.1 | 1.1 |
| Motor Vehicle Parts and Accessories Industries | 0.9 | 0.9 | 0.8 | 0.9 | 0.9 |
| Electrical and Electronic Products Industries | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 |
| Glass and Glass Products Industries | 0.6 | 0.5 | 0.6 | 0.7 | 0.7 |
| Lime Industry | 1 | 0.8 | 0.8 | 0.9 | 1 |
| Plastic and Synthetic Resin Industry | 0.6 | 0.6 | 0.5 | 1 | 0.5 |
| Other Manufacturing n.e.c. | 8.3 | 8.3 | 7.8 | 4.1 | 3.3 |
| **GHG Intensity (tonne/TJ)** [a,c,d] | **37.8** | **37.1** | **36.8** | **36.7** | **35.5** |

*Includes only end-use energy-related GHG emissions.

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

*continued*

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | -33.3% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.0% |
| 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.0% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | -20.0% |
| 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.0% |
| 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | -50.0% |
| 1.2 | 1.2 | 1.4 | 1.4 | 1.3 | 1.1 | 120.0% |
| 0.7 | 0.9 | 0.9 | 0.9 | 1 | 1 | 66.7% |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.0% |
| 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 50.0% |
| 1.4 | 1.4 | 1.5 | 1.4 | 1.2 | 1.4 | 40.0% |
| 0.4 | 0.5 | 0.6 | 0.5 | 0.4 | 0.4 | -20.0% |
| 1.2 | 1.3 | 1.2 | 1 | 1.2 | 1.2 | 33.3% |
| 0.9 | 1 | 1 | 0.9 | 1 | 1 | 11.1% |
| 0.4 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.0% |
| 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | -16.7% |
| 1 | 1 | 1.1 | 1.1 | 1.1 | 1.1 | 10.0% |
| 1 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 | 0.0% |
| 5.1 | 5.8 | 5.6 | 4.9 | 5.3 | 8.2 | -1.2% |
| **35.8** | **36.1** | **35.9** | **35** | **34.2** | **34.5** | **-8.7%** |

## Industrial Activity Index by Industry (1990 = 1.0) [b,d]

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| Gold Mines* | 1 | 0.97 | 0.87 | 0.84 | 0.94 |
| Copper, Copper-Zinc and Nickel-Copper Mines* | 1 | 0.93 | 0.89 | 0.82 | 0.71 |
| Silver-Lead-Zinc Mines* | 1 | 1.01 | 1.05 | 0.63 | 0.59 |
| Iron Mines* | 1 | 1.03 | 0.90 | 0.83 | 1.00 |
| Other Metal Mines* | 1 | 0.84 | 0.69 | 0.65 | 0.64 |
| Peat Industry* | 1 | 1.16 | 1.04 | 1.13 | 1.38 |
| Gypsum Mines* | 1 | 0.78 | 0.85 | 0.90 | 1.05 |
| Potash Mines* | 1 | 1.06 | 1.04 | 0.98 | 1.17 |
| Salt Mines* | 1 | 1.13 | 1.04 | 1.04 | 1.21 |
| Other Non-Metal Mines* | 1 | 0.91 | 0.89 | 0.87 | 0.92 |
| Upstream Mining | 1 | 1.01 | 1.04 | 1.14 | 1.23 |
| Construction | 1 | 0.93 | 0.88 | 0.86 | 0.88 |
| Forestry | 1 | 0.88 | 0.88 | 0.94 | 0.96 |
| Pulp Industry* | 1 | 1.07 | 1.02 | 0.96 | 1.10 |
| Newsprint Industry* | 1 | 0.99 | 0.98 | 1.04 | 1.07 |
| Paperboard Industry* | 1 | 1.06 | 1.09 | 1.11 | 1.23 |
| Building Board Industry* | 1 | 0.85 | 1.05 | 1.34 | 1.44 |
| Other Paper Industries* | 1 | 1.01 | 1.03 | 1.13 | 1.18 |
| Primary Production of Aluminum* | 1 | 1.16 | 1.26 | 1.47 | 1.44 |
| Other Non-Ferrous Smelting and Refining | 1 | 1.01 | 1.04 | 1.04 | 0.96 |
| Petroleum Refining* | 1 | 0.97 | 0.95 | 0.97 | 0.99 |
| Cement Industry* | 1 | 0.82 | 0.82 | 0.84 | 0.99 |
| Industrial Inorganic Chemicals Industries* | 1 | 0.92 | 0.94 | 0.96 | 0.99 |
| Industrial Organic Chemicals Industries** | 1 | 0.85 | 0.88 | 0.81 | 0.89 |
| Chemical Fertilizers and Fertilizer Materials Industries* | 1 | 1.00 | 1.02 | 0.96 | 0.98 |
| Iron and Steel* | 1 | 0.97 | 1.06 | 1.15 | 1.16 |
| Meat and Poultry Products Industries* | 1 | 0.98 | 1.03 | 1.03 | 1.09 |
| Fruit and Vegetable Industries** | 1 | 1.00 | 0.98 | 1.06 | 1.06 |
| Bakery Products Industries** | 1 | 1.00 | 1.03 | 1.04 | 1.10 |
| Other Food Industries** | 1 | 1.02 | 1.05 | 1.05 | 1.10 |
| Dairy Products Industries* | 1 | 0.99 | 0.94 | 0.92 | 0.96 |
| Beverage Industries (excluding breweries)** | 1 | 0.94 | 1.09 | 1.11 | 0.99 |

* Physical units of production is used as the measure of activity for these sub-sectors.
** Gross output (in 1986 dollars) is used as the measure of activity for these sub-sectors.
For the remaining sub-sectors, gross domestic product (in 1986 dollars) is used.

**Sources:**
b) Informetrica Limited, *TIM/RIM Database and National Reference Forecast*, Ottawa, November 2001.
d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| 1.06 | 1.26 | 1.32 | 1.47 | 1.84 | 1.74 |
| 0.90 | 0.74 | 0.70 | 0.78 | 0.54 | 0.66 |
| 0.76 | 0.94 | 0.75 | 0.69 | 0.61 | 0.55 |
| 1.02 | 1.00 | 1.01 | 1.04 | 0.91 | 1.07 |
| 0.66 | 0.60 | 0.55 | 0.57 | 0.50 | 0.54 |
| 1.55 | 1.27 | 1.47 | 1.67 | 2.04 | 1.80 |
| 0.97 | 0.97 | 1.04 | 1.02 | 1.12 | 1.03 |
| 1.30 | 1.14 | 1.29 | 1.32 | 1.19 | 1.35 |
| 1.00 | 1.18 | 1.35 | 1.34 | 1.25 | 1.16 |
| 0.91 | 0.88 | 0.89 | 0.69 | 2.08 | 2.13 |
| 1.27 | 1.32 | 1.37 | 1.34 | 1.30 | 1.39 |
| 0.84 | 0.82 | 0.86 | 0.86 | 0.90 | 0.90 |
| 0.98 | 0.95 | 0.96 | 0.94 | 1.03 | 1.04 |
| 1.14 | 1.07 | 1.09 | 0.99 | 1.06 | 1.13 |
| 1.09 | 1.05 | 1.09 | 1.05 | 1.15 | 1.19 |
| 1.22 | 1.27 | 1.30 | 1.35 | 1.43 | 1.40 |
| 1.70 | 2.13 | 2.53 | 2.74 | 3.21 | 3.28 |
| 1.27 | 1.30 | 1.33 | 1.35 | 1.41 | 1.47 |
| 1.39 | 1.46 | 1.48 | 1.51 | 1.52 | 1.51 |
| 1.18 | 1.14 | 1.09 | 1.20 | 1.16 | 1.27 |
| 0.99 | 1.04 | 1.07 | 1.07 | 1.08 | 1.11 |
| 1.12 | 1.06 | 1.14 | 1.15 | 1.20 | 1.24 |
| 1.04 | 1.04 | 1.01 | 1.02 | 1.03 | 1.00 |
| 0.93 | 0.92 | 0.99 | 1.02 | 1.04 | 1.12 |
| 1.05 | 1.06 | 1.06 | 1.06 | 1.09 | 1.10 |
| 1.15 | 1.22 | 1.25 | 1.22 | 1.29 | 1.29 |
| 1.12 | 1.14 | 1.19 | 1.29 | 1.40 | 1.44 |
| 1.07 | 1.08 | 1.16 | 1.22 | 1.25 | 1.23 |
| 1.03 | 1.08 | 1.09 | 1.12 | 1.13 | 1.19 |
| 1.13 | 1.18 | 1.17 | 1.22 | 1.23 | 1.28 |
| 0.98 | 0.98 | 1.01 | 1.01 | 1.02 | 1.01 |
| 1.09 | 1.09 | 1.14 | 1.20 | 1.27 | 1.29 |

*continued*

## Industrial Activity Index by Industry (1990 = 1.0)[b,d] *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| Brewery Products Industries* | 1 | 0.95 | 0.92 | 0.98 | 1.02 |
| Tobacco Products Industries** | 1 | 0.98 | 0.94 | 0.95 | 1.09 |
| Rubber Products Industries* | 1 | 0.83 | 0.97 | 1.12 | 1.25 |
| Plastic Products Industries** | 1 | 0.95 | 1.00 | 1.07 | 1.19 |
| Leather and Allied Products Industries** | 1 | 0.81 | 0.78 | 0.81 | 0.83 |
| Primary Textile Industries** | 1 | 0.96 | 0.96 | 0.99 | 1.10 |
| Textile Products Industries** | 1 | 0.89 | 0.83 | 0.85 | 0.93 |
| Clothing Industries** | 1 | 0.89 | 0.85 | 0.86 | 0.88 |
| Sawmill and Planing Mill Products Industry* | 1 | 1.03 | 1.12 | 1.16 | 1.19 |
| Other Wood Industries** | 1 | 0.86 | 0.90 | 0.96 | 1.00 |
| Furniture and Fixture Industries** | 1 | 0.84 | 0.83 | 0.86 | 0.97 |
| Printing, Publishing and Allied Industries** | 1 | 0.92 | 0.87 | 0.84 | 0.83 |
| Fabricated Metal Products Industries** | 1 | 0.89 | 0.85 | 0.86 | 0.96 |
| Machinery Industries** | 1 | 0.83 | 0.80 | 0.90 | 1.02 |
| Motor Vehicle Industry* | 1 | 0.96 | 1.03 | 1.15 | 1.20 |
| Motor Vehicle Parts and Accessories Industries** | 1 | 0.92 | 0.99 | 1.17 | 1.33 |
| Electrical and Electronic Products Industries** | 1 | 1.02 | 1.09 | 1.12 | 1.40 |
| Glass and Glass Products Industries** | 1 | 0.91 | 0.95 | 1.04 | 1.09 |
| Lime Industry* | 1 | 0.99 | 1.00 | 1.02 | 1.06 |
| Plastic and Synthetic Resin Industry* | 1 | 1.01 | 1.09 | 1.12 | 1.20 |
| Other Manufacturing n.e.c. | 1 | 0.92 | 0.90 | 0.91 | 0.95 |

* Physical units of production is used as the measure of activity for these sub-sectors.
** Gross output (in 1986 dollars) is used as the measure of activity for these sub-sectors. For the remaining sub-sectors, gross domestic product (in 1986 dollars) is used.

**Sources:**
b) Informetrica Limited, *TIM/RIM Database and National Reference Forecast*, Ottawa, November 2001.
d) Canadian Industrial Energy End-Use Data and Analysis Center, *Development of Energy Intensity Indicators for Canadian Industry 1990 to 2000*, Simon Fraser University, January 2002.

*continued*

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| 1.03 | 1.00 | 0.99 | 1.02 | 1.03 | 1.02 |
| 1.01 | 1.00 | 0.98 | 1.01 | 0.97 | 0.94 |
| 1.36 | 1.83 | 2.05 | 2.23 | 2.17 | 2.17 |
| 1.18 | 1.29 | 1.38 | 1.45 | 1.65 | 1.66 |
| 0.83 | 0.73 | 0.73 | 0.67 | 0.60 | 0.49 |
| 1.08 | 1.13 | 1.23 | 1.24 | 1.23 | 1.21 |
| 0.95 | 0.92 | 1.00 | 1.01 | 1.02 | 1.02 |
| 0.89 | 0.83 | 0.89 | 0.89 | 0.87 | 0.88 |
| 1.15 | 1.21 | 1.24 | 1.25 | 1.36 | 1.39 |
| 0.99 | 1.05 | 1.24 | 1.26 | 1.36 | 1.29 |
| 1.06 | 1.13 | 1.31 | 1.56 | 1.70 | 1.88 |
| 0.79 | 0.78 | 0.80 | 0.80 | 0.77 | 0.79 |
| 0.99 | 1.01 | 1.05 | 1.08 | 1.14 | 1.18 |
| 1.12 | 1.11 | 1.23 | 1.19 | 1.10 | 1.14 |
| 1.23 | 1.25 | 1.38 | 1.35 | 1.57 | 1.53 |
| 1.39 | 1.43 | 1.65 | 1.72 | 1.96 | 2.01 |
| 1.68 | 1.63 | 1.89 | 2.35 | 2.82 | 4.14 |
| 1.06 | 1.13 | 1.23 | 1.50 | 1.67 | 1.88 |
| 1.19 | 1.18 | 1.25 | 1.25 | 1.29 | 1.28 |
| 1.30 | 1.38 | 1.37 | 1.43 | 1.57 | 1.66 |
| 0.97 | 1.02 | 1.04 | 1.16 | 1.25 | 1.45 |

# *Chapter 5* Transportation Sector

## The Data Situation

The aggregate transportation energy use data presented in this report are published in Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada* (QRESD) (Cat. No. 57-003). Additional information needed to perform analysis on the transportation sector, such as the stock, the efficiencies and the distance travelled, comes from various sources.

Previously, the vehicle stock data were based on Statistics Canada's *Road Motor Vehicles Registrations* (Cat. No. 53-219), which provided data by vehicle type and provinces. The Office of Energy Efficiency (OEE) is now using the vehicle stock data and the new vehicle registrations data from the *Canadian Vehicles in Operation Census* (CVIOC) produced by DesRosiers Automotive Consultants and the *Truck Industry Profile* (TIP) from R.L. Polk & Co. These data, disaggregated by weight class, fuel type and model year, have greatly improved the OEE's analytical capacity. The stock of buses and motorcycles are based on several Statistics Canada publications, such as *Passenger Bus and Urban Transit Statistics* and the *Canadian Vehicle Survey*.

Other sources, such as Statistics Canada's *National Private Vehicle Use Survey* and the Transport Canada database *Vehicle Fuel Economy Information System* (VFEIS), are used to assess the fuel efficiency and distance travelled for some vehicles.

The Transportation Energy Demand Model is an energy demand model developed by the OEE. This model estimates the annual fuel use for each province and vehicle category, using vehicle stock characteristics and usages, the average distance travelled by vehicle age and the vehicle fuel economy. The annual fuel use estimates are calibrated to the energy demand data reported in Statistics Canada's QRESD.

## Transportation Energy Use by Fuel Type and Transportation Mode

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Energy Use (PJ)** [a] | **1,877.9** | **1,887.3** | **1,950.1** | **1,973.2** | **1,997.8** |
| Total Passenger Transportation [d] | 1,149.0 | 1,094.9 | 1,125.2 | 1,143.6 | 1,193.8 |
| Total Freight Transportation [d] | 675.3 | 655.9 | 666.3 | 669.9 | 713.6 |
| Off-Road [d] | 53.6 | 56.5 | 58.6 | 59.7 | 60.4 |
| ***Energy Use by Fuel Type (PJ)*** [a] | | | | | |
| Motor Gasoline | 1,120.4 | 1,089.2 | 1,112.8 | 1,143.3 | 1,179.2 |
| Propane | 35.4 | 36.7 | 42.5 | 31.6 | 29.7 |
| Natural Gas | 1.7 | 2.1 | 2.3 | 2.4 | 2.5 |
| Aviation Gasoline | 5.5 | 4.2 | 3.8 | 3.7 | 3.7 |
| Aviation Turbo Fuel | 181.9 | 183.3 | 188 | 181.7 | 170.8 |
| Diesel Fuel Oil | 469.8 | 442.4 | 451 | 471.8 | 519.1 |
| Heavy Fuel Oil | 60.1 | 66.4 | 65.8 | 55.8 | 59.9 |
| Light Fuel Oil and Kerosene | 0 | 0 | 0 | 0 | 0 |
| Electricity | 3.1 | 3.1 | 2.9 | 2.9 | 2.9 |
| Coal | 0 | 0 | 0 | 0 | 0 |
| ***Energy Use by Transportation Mode (PJ)*** [a,b,c,d] | | | | | |
| Small Cars | 352.8 | 347.4 | 352.8 | 359.1 | 362.1 |
| Large Cars | 327.5 | 311.8 | 307.9 | 301.2 | 297.8 |
| Light Trucks | 351.5 | 345.4 | 370.2 | 390.9 | 421.9 |
| Medium Trucks | 101.3 | 98.4 | 103.4 | 107.5 | 114.9 |
| Heavy Trucks | 248.2 | 228.3 | 225 | 242.5 | 270.9 |
| Motorcycles | 1.7 | 1.6 | 1.7 | 1.8 | 2 |
| School Bus | 13 | 12.8 | 12.5 | 12.7 | 16.8 |
| Urban Transit | 35.9 | 35.6 | 40 | 41.3 | 45.1 |
| Inter-City Bus | 9 | 8.6 | 9 | 7.9 | 8.3 |
| Air | 187.4 | 167.5 | 172.8 | 165.4 | 174.5 |
| Rail | 89.5 | 82.9 | 86.7 | 86.4 | 89.3 |
| Marine | 106.5 | 110.6 | 109.7 | 96.8 | 103.9 |
| Off-Road | 53.6 | 56.5 | 58.6 | 59.7 | 60.4 |
| **Activity** | | | | | |
| Passenger-Kilometres (million) [c] | 508,722 | 493,841 | 516,634 | 521,707 | 547,266 |
| Tonne-Kilometres (million) [c] | 540,500 | 532,683 | 511,294 | 530,073 | 591,942 |
| **Passenger Transportation Energy Intensity (MJ/passenger-kilometre)*** [a,d] | **2.18** | **2.15** | **2.12** | **2.14** | **2.13** |
| **Freight Transportation Energy Intensity (MJ/tonne-kilometre)** [a,d] | **1.25** | **1.23** | **1.3** | **1.26** | **1.21** |

*Passenger transportation energy intensity excludes non-commercial aviation.

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215).
Data for 1999 estimated by Natural Resources Canada.
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).

c) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216).
Data for 2000 estimated by Natural Resources Canada.

d) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **2,084.9** | **2,043.8** | **2,117.2** | **2,194.5** | **2,252.8** | **2,282.1** | **21.5%** |
| 1,207.8 | 1,226.4 | 1,245.2 | 1,285.1 | 1,301.1 | 1,294.3 | 12.6% |
| 734.7 | 752.9 | 805.1 | 839.3 | 876.3 | 905.5 | 34.1% |
| 62.4 | 63.7 | 66.9 | 70.1 | 75.5 | 82.3 | 53.5% |
| | | | | | | |
| 1,174.6 | 1,186.6 | 1,213.1 | 1,261.4 | 1,293.4 | 1,295.1 | 15.6% |
| 32.8 | 30.9 | 28.3 | 27 | 22.6 | 15.9 | -55.1% |
| 2.4 | 2.2 | 2.6 | 2.5 | 2.2 | 2.4 | 41.2% |
| 4.1 | 3.9 | 3.7 | 3.9 | 3.6 | 3.6 | -34.5% |
| 183.2 | 205.5 | 210.9 | 222.8 | 233.9 | 235.9 | 29.7% |
| 548.4 | 556 | 599 | 599.1 | 628.2 | 658.3 | 40.1% |
| 56.6 | 54.9 | 56.7 | 74.8 | 65.9 | 67.8 | 12.8% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 3 | 3 | 3 | 2.9 | 3 | 3.1 | 0.0% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| | | | | | | |
| 351.5 | 345.8 | 342.5 | 338 | 334.5 | 324.3 | -8.1% |
| 286.6 | 277.9 | 272 | 265.7 | 261.4 | 251.5 | -23.2% |
| 441.3 | 462 | 489.4 | 539 | 560.1 | 564.8 | 60.7% |
| 119.8 | 126 | 135 | 136.6 | 149.7 | 158.1 | 56.1% |
| 298.3 | 308.5 | 344 | 347.8 | 371 | 389 | 56.7% |
| 1.8 | 1.8 | 1.9 | 2 | 2.1 | 2.3 | 35.3% |
| 16.8 | 14.2 | 13.2 | 16 | 14.8 | 15.1 | 16.2% |
| 49 | 47.1 | 50.5 | 48.9 | 46.5 | 50.3 | 40.1% |
| 7.5 | 7.4 | 6.9 | 8 | 7.4 | 7.8 | -13.3% |
| 187.3 | 209.4 | 214.6 | 226.7 | 237.5 | 239.5 | 27.8% |
| 80.9 | 79.1 | 80.2 | 76.5 | 81.1 | 83.1 | -7.2% |
| 101.7 | 99.9 | 100.1 | 119.2 | 111.5 | 114 | 7.0% |
| 62.4 | 63.7 | 66.9 | 70.1 | 75.5 | 82.3 | 53.5% |
| | | | | | | |
| 548,561 | 557,953 | 570,956 | 582,022 | 584,428 | 583,326 | 14.7% |
| 610,109 | 625,689 | 667,174 | 672,525 | 719,953 | 741,188 | 37.1% |
| | | | | | | |
| **2.14** | **2.14** | **2.13** | **2.15** | **2.18** | **2.17** | **-0.5%** |
| | | | | | | |
| **1.2** | **1.2** | **1.21** | **1.25** | **1.22** | **1.22** | **-2.4%** |

## Transportation GHG Emissions by Fuel Type and Transportation Mode

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total GHG Emissions (Mt) [a,k]** | **135** | **129.8** | **132.9** | **134.6** | **141.5** |
| Total Passenger Transportation [d,k] | 81.9 | 77.9 | 80.1 | 81.5 | 85.1 |
| Total Freight Transportation [d,k] | 49.4 | 47.9 | 48.7 | 49 | 52.1 |
| Off-Road [d,k] | 3.8 | 4 | 4.1 | 4.2 | 4.2 |
| ***GHG Emissions by Fuel Type (Mt) [a,k]*** | | | | | |
| Motor Gasoline | 80 | 77.8 | 79.5 | 81.7 | 84.3 |
| Propane | 2.1 | 2.2 | 2.5 | 1.9 | 1.8 |
| Natural Gas | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Aviation Gasoline | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 |
| Aviation Turbo Fuel | 13.2 | 11.8 | 12.2 | 11.7 | 12.3 |
| Diesel Fuel Oil | 34.6 | 32.5 | 33.2 | 34.7 | 38.1 |
| Heavy Fuel Oil | 4.5 | 5 | 4.9 | 4.2 | 4.5 |
| Light Fuel Oil and Kerosene | 0 | 0 | 0 | 0 | 0 |
| Electricity | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 |
| Coal | 0 | 0 | 0 | 0 | 0 |
| ***GHG Emissions by Transportation Mode (Mt) [b,c,d,k]*** | | | | | |
| Small Cars | 25 | 24.6 | 25 | 25.5 | 25.7 |
| Large Cars | 23.1 | 22 | 21.7 | 21.2 | 21 |
| Light Trucks | 25.2 | 24.7 | 26.5 | 28 | 30.3 |
| Medium Trucks | 7.3 | 7.1 | 7.5 | 7.8 | 8.3 |
| Heavy Trucks | 17.7 | 16.3 | 16 | 17.3 | 19.3 |
| Motorcycles | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| School Bus | 0.9 | 0.9 | 0.8 | 0.9 | 1.1 |
| Urban Transit | 2.5 | 2.5 | 2.8 | 2.9 | 3.1 |
| Inter-City Bus | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| Air | 13.6 | 12.1 | 12.5 | 12 | 12.6 |
| Rail | 7.1 | 6.6 | 6.9 | 6.9 | 7.1 |
| Marine | 8.1 | 8.4 | 8.4 | 7.4 | 7.9 |
| Off-Road | 3.8 | 4 | 4.1 | 4.2 | 4.2 |
| **GHG Intensity (tonne/TJ) [a,k]** | **71.9** | **71.8** | **71.8** | **71.9** | **71.9** |
| **GHG Emissions related to Electricity (Mt) [a,k]** | **0.2** | **0.2** | **0.2** | **0.1** | **0.1** |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).

c) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.

d) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.

k) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990-2000 |
|---|---|---|---|---|---|---|
| **144.1** | **146.8** | **152.2** | **156.9** | **161.1** | **163.4** | **21.8%** |
| 86.1 | 87.5 | 88.9 | 90.7 | 91.9 | 91.5 | 11.7% |
| 53.6 | 54.8 | 58.6 | 61.2 | 64 | 66.1 | 33.8% |
| 4.4 | 4.5 | 4.7 | 4.9 | 5.3 | 5.7 | 50.0% |
| | | | | | | |
| 84 | 84.9 | 86.8 | 89.4 | 91.7 | 91.8 | 14.8% |
| 2 | 1.8 | 1.7 | 1.6 | 1.4 | 1 | -52.4% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0% |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | -25.0% |
| 13.2 | 14.9 | 15.2 | 15.7 | 16.4 | 16.6 | 25.8% |
| 40.1 | 40.6 | 43.7 | 44.1 | 46.2 | 48.4 | 39.9% |
| 4.2 | 4.1 | 4.2 | 5.5 | 4.8 | 5 | 11.1% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.0% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| | | | | | | |
| 24.9 | 24.5 | 24.3 | 23.7 | 23.5 | 22.8 | -8.8% |
| 20.2 | 19.6 | 19.2 | 18.6 | 18.3 | 17.6 | -23.8% |
| 31.7 | 33.2 | 35.2 | 38.4 | 40 | 40.4 | 60.3% |
| 8.6 | 9.1 | 9.7 | 9.8 | 10.8 | 11.4 | 56.2% |
| 21.3 | 22 | 24.5 | 25 | 26.7 | 28 | 58.2% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 100.0% |
| 1.2 | 1 | 0.9 | 1.1 | 1 | 1 | 11.1% |
| 3.4 | 3.3 | 3.5 | 3.5 | 3.3 | 3.6 | 44.0% |
| 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.6 | 0.0% |
| 13.5 | 15.1 | 15.5 | 15.9 | 16.7 | 16.8 | 23.5% |
| 6.4 | 6.3 | 6.4 | 6.1 | 6.5 | 6.7 | -5.6% |
| 7.8 | 7.6 | 7.7 | 9 | 8.5 | 8.6 | 6.2% |
| 4.4 | 4.5 | 4.7 | 4.9 | 5.3 | 5.7 | 50.0% |
| | | | | | | |
| **71.9** | **71.9** | **71.9** | **71.5** | **71.5** | **71.6** | **-8.4%** |
| | | | | | | |
| **0.2** | **0.1** | **0.2** | **0.2** | **0.2** | **0.2** | **0.0%** |

## Passenger Transportation Energy Use by Fuel Type and Transportation Mode

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Passenger Transportation Energy Use (PJ)** [a] | **1,148.8** | **1,094.8** | **1,125.2** | **1,143.6** | **1,193.8** |
| ***Energy Use by Fuel Type (PJ)*** [a] | | | | | |
| Motor Gasoline | 884 | 849.6 | 866.9 | 895 | 929.9 |
| Propane | 15.5 | 16.7 | 18.5 | 14.6 | 13.8 |
| Natural Gas | 1.6 | 2 | 2.2 | 2.3 | 2.4 |
| Aviation Gasoline | 5.5 | 4.2 | 3.8 | 3.7 | 3.7 |
| Aviation Turbo Fuel | 181.9 | 163.3 | 169 | 161.7 | 170.8 |
| Diesel Fuel Oil | 57.4 | 56.1 | 61.9 | 63.4 | 70.2 |
| Electricity | 3.1 | 3.1 | 2.9 | 2.9 | 2.9 |
| ***Energy Use by Transportation Mode (PJ)*** [a,d,g,h] | | | | | |
| Small Cars | 352.8 | 347.4 | 352.8 | 359.1 | 362.1 |
| Large Cars | 327.5 | 311.8 | 307.9 | 301.2 | 297.8 |
| Light Trucks | 216.5 | 206.3 | 225.5 | 250.7 | 284.4 |
| Motorcycles | 1.7 | 1.6 | 1.7 | 1.8 | 2 |
| School Bus | 13 | 12.8 | 12.5 | 12.7 | 16.8 |
| Urban Transit | 35.9 | 35.6 | 40 | 41.3 | 45.1 |
| Inter-City Bus | 9 | 8.6 | 9 | 7.9 | 8.3 |
| Air | 187.4 | 167.5 | 172.8 | 165.4 | 174.5 |
| Rail | 5.1 | 3.3 | 3.2 | 3.4 | 2.9 |
| ***Activity*** | | | | | |
| **Total Passenger-Kilometres (million)** [a] | **506,722** | **483,841** | **516,834** | **521,787** | **547,288** |
| ***Passenger-Kilometres by Transportation Mode (million)*** | | | | | |
| Small Cars [d] | 202,688 | 200,707 | 207,616 | 209,239 | 210,992 |
| Large Cars [d] | 132,833 | 130,749 | 134,007 | 131,995 | 132,111 |
| Light Trucks [d] | 64,800 | 62,798 | 69,270 | 76,147 | 85,525 |
| Motorcycles [d] | 985 | 960 | 990 | 1,037 | 1,111 |
| School Bus [b] | 10,245 | 11,839 | 12,579 | 10,440 | 15,523 |
| Urban Transit [b] | 18,183 | 17,776 | 19,001 | 20,448 | 22,239 |
| Inter-City Bus [b] | 10,208 | 9,580 | 9,549 | 9,891 | 12,586 |
| Air [c,h] | 66,776 | 58,007 | 62,183 | 61,098 | 65,739 |
| Rail [c] | 2,004 | 1,426 | 1,439 | 1,413 | 1,440 |
| **Energy Intensity (MJ/passenger-kilometre)*** [d] | **2.18** | **2.15** | **2.12** | **2.14** | **2.13** |

*Passenger transportation energy intensity excludes non-commercial aviation.

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).

c) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216).
Data for 2000 estimated by Natural Resources Canada.

d) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.

g) Statistics Canada, *Aviation Statistics Centre: Service Bulletin*, Ottawa, 1990–1996; 22(1) –28(12), (Cat. No. 51-004).

h) Statistics Canada, *Canadian Civil Aviation 1995–1998*, Ottawa, 1996–2000, (Cat. No. 51-206).
Data for 1999–2000 estimated by Natural Resources Canada.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990-2000 |
|---|---|---|---|---|---|---|
| **1,207.8** | **1,226.4** | **1,245.2** | **1,265.1** | **1,301.1** | **1,254.3** | **12.8%** |
| 926.9 | 927.6 | 939.3 | 966.8 | 977.3 | 966.1 | 9.3% |
| 14.7 | 13.2 | 12.6 | 12.3 | 10.3 | 7.9 | -49.0% |
| 2.3 | 2.1 | 2.5 | 2.5 | 2.2 | 2.3 | 43.8% |
| 4.1 | 3.9 | 3.7 | 3.9 | 3.6 | 3.6 | -34.5% |
| 183.2 | 205.5 | 210.9 | 222.8 | 233.9 | 235.9 | 29.7% |
| 73.7 | 70.9 | 73.3 | 73.9 | 70.8 | 75.3 | 31.2% |
| 3 | 3 | 3 | 2.9 | 3 | 3.1 | 0.0% |
| 351.5 | 345.8 | 342.5 | 338 | 334.5 | 324.3 | -8.1% |
| 286.6 | 277.9 | 272 | 265.7 | 261.4 | 251.5 | -23.2% |
| 304.9 | 320.1 | 341.3 | 377.7 | 394.5 | 401 | 85.2% |
| 1.8 | 1.8 | 1.9 | 2 | 2.1 | 2.3 | 35.3% |
| 16.8 | 14.2 | 13.2 | 16 | 14.8 | 15.1 | 16.2% |
| 49 | 47.1 | 50.5 | 48.9 | 46.5 | 50.3 | 40.1% |
| 7.5 | 7.4 | 6.9 | 8 | 7.4 | 7.8 | -13.3% |
| 187.3 | 209.4 | 214.6 | 226.7 | 237.5 | 239.5 | 27.8% |
| 2.4 | 2.5 | 2.3 | 2.2 | 2.5 | 2.5 | -51.0% |
| **548,981** | **557,963** | **570,956** | **582,822** | **584,428** | **583,326** | **14.7%** |
| 204,121 | 203,452 | 201,182 | 200,301 | 198,308 | 195,456 | -3.6% |
| 127,962 | 126,084 | 124,002 | 122,664 | 121,020 | 118,682 | -10.7% |
| 90,717 | 96,010 | 101,161 | 111,435 | 115,381 | 117,886 | 81.9% |
| 1,011 | 1,023 | 1,065 | 1,126 | 1,154 | 1,313 | 33.3% |
| 15,367 | 14,368 | 15,418 | 16,949 | 15,899 | 15,739 | 53.6% |
| 23,066 | 23,070 | 24,308 | 22,971 | 21,832 | 22,657 | 24.6% |
| 11,346 | 10,311 | 10,448 | 10,651 | 10,309 | 10,220 | 0.1% |
| 73,499 | 82,120 | 91,859 | 94,467 | 98,983 | 99,790 | 49.4% |
| 1,473 | 1,513 | 1,515 | 1,458 | 1,544 | 1,582 | -21.1% |
| **2.14** | **2.14** | **2.13** | **2.15** | **2.18** | **2.17** | **-6.9%** |

## Passenger Transportation GHG Emissions by Fuel Type and Transportation Mode

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Passenger Transportation GHG Emissions (Mt)** [a,d,k] | **81.9** | **77.9** | **80.1** | **81.5** | **85.1** |
| ***GHG Emissions by Fuel Type (Mt)*** [a,d,k] | | | | | |
| Motor Gasoline | 63 | 60.5 | 61.8 | 63.8 | 66.3 |
| Propane | 0.9 | 1 | 1.1 | 0.9 | 0.8 |
| Natural Gas | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Aviation Gasoline | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 |
| Aviation Turbo Fuel | 13.2 | 11.8 | 12.2 | 11.7 | 12.3 |
| Diesel Fuel Oil | 4.1 | 4.0 | 4.4 | 4.6 | 5.0 |
| Electricity | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 |
| ***GHG Emissions by Transportation Mode (Mt)*** [a,b,c,d,k] | | | | | |
| Small Cars | 25 | 24.6 | 25 | 25.5 | 25.7 |
| Large Cars | 23.1 | 22 | 21.7 | 21.2 | 21 |
| Light Trucks | 15.7 | 14.9 | 16.3 | 18.1 | 20.6 |
| Motorcycles | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| School Bus | 0.9 | 0.9 | 0.8 | 0.9 | 1.1 |
| Urban Transit | 2.5 | 2.5 | 2.8 | 2.9 | 3.1 |
| Inter-City Bus | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| Air | 13.6 | 12.1 | 12.5 | 12 | 12.6 |
| Rail | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 |
| **GHG Intensity (tonne/TJ)** [d,k] | **71.2** | **71.2** | **71.2** | **71.2** | **71.3** |
| **GHG Emissions related to Electricity (Mt)** [d,k] | **0.2** | **0.2** | **0.2** | **0.1** | **0.1** |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1998*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).

c) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216). Data for 2000 estimated by Natural Resources Canada.

d) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.

k) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1995–2000 |
|---|---|---|---|---|---|---|
| **86.1** | **87.5** | **88.9** | **90.7** | **91.9** | **91.5** | **11.7%** |
| 66.2 | 66.2 | 67.1 | 68.4 | 69.2 | 68.4 | 8.6% |
| 0.9 | 0.8 | 0.7 | 0.7 | 0.6 | 0.5 | -44.4% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0% |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | -25.0% |
| 13.2 | 14.9 | 15.2 | 15.7 | 16.4 | 16.6 | 25.8% |
| 5.3 | 5.1 | 5.2 | 5.3 | 5.1 | 5.4 | 31.7% |
| 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.0% |
| 24.9 | 24.5 | 24.3 | 23.7 | 23.5 | 22.8 | -8.8% |
| 20.2 | 19.6 | 19.2 | 18.6 | 18.3 | 17.6 | -23.8% |
| 22 | 23.1 | 24.7 | 27.1 | 28.3 | 28.7 | 82.8% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 100.0% |
| 1.2 | 1 | 0.9 | 1.1 | 1 | 1 | 11.1% |
| 3.4 | 3.3 | 3.5 | 3.5 | 3.3 | 3.6 | 44.0% |
| 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.6 | 0.0% |
| 13.5 | 15.1 | 15.5 | 15.9 | 16.7 | 16.8 | 23.5% |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | -50.0% |
| **71.3** | **71.3** | **71.4** | **70.6** | **70.6** | **70.7** | **-0.7%** |
| **0.2** | **0.1** | **0.2** | **0.2** | **0.2** | **0.2** | **0.0%** |

## Freight Transportation Energy Use by Fuel Type and Transportation Mode

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Freight Transportation Energy Use (PJ)** [a,d] | **675.3** | **655.9** | **666.3** | **660.9** | **713.6** |
| ***Energy Use by Fuel Type (PJ)*** [a,d] | | | | | |
| Motor Gasoline | 182.8 | 183.2 | 187.3 | 188.5 | 188.9 |
| Propane | 19.9 | 20.1 | 24 | 17 | 15.9 |
| Natural Gas | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Diesel Fuel Oil | 412.4 | 386.2 | 389.1 | 408.4 | 448.8 |
| Heavy Fuel Oil | 60.1 | 66.4 | 65.8 | 55.8 | 59.9 |
| Light Fuel Oil and Kerosene | 0 | 0 | 0 | 0 | 0 |
| Coal | 0 | 0 | 0 | 0 | 0 |
| ***Energy Use by Transportation Mode (PJ)*** [a,d,e,i] | | | | | |
| Light Trucks | 134.9 | 139 | 144.8 | 140.1 | 137.5 |
| Medium Trucks | 101.3 | 98.4 | 103.4 | 107.5 | 114.9 |
| Heavy Trucks | 248.2 | 228.3 | 225 | 242.5 | 270.9 |
| Rail | 84.4 | 79.6 | 83.5 | 83 | 86.4 |
| Marine | 106.5 | 110.6 | 109.7 | 96.8 | 103.9 |
| **Activity** | | | | | |
| **Total Tonne-Kilometres (million)** [d] | **540,560** | **532,683** | **511,294** | **530,073** | **591,942** |
| ***Tonne-Kilometres by Transportation Mode (million)*** | | | | | |
| Light Trucks [d] | 13,281 | 13,821 | 14,347 | 13,940 | 13,556 |
| Medium Trucks [d,j] | 13,468 | 13,215 | 14,040 | 14,811 | 15,996 |
| Heavy Trucks [d,j] | 77,800 | 70,600 | 72,900 | 84,600 | 102,000 |
| Rail [c] | 248,371 | 260,537 | 250,607 | 256,338 | 288,432 |
| Marine [i] | 187,580 | 174,510 | 159,400 | 160,384 | 171,958 |
| **Energy Intensity (MJ/tonne-kilometre)** [d] | **1.25** | **1.23** | **1.30** | **1.26** | **1.21** |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.
c) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216).
Data for 2000 estimated by Natural Resources Canada.
d) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.
e) Royal Commission on National Passenger Transportation, *Direction: The Final Report of the Royal Commission on National Passenger Transportation*, Ottawa, 1992; 2.
i) Transport Canada, Surface and Marine Statistics and Forecasts Division, December 1999.
Data for 2000 estimated by Natural Resources Canada.
j) Statistics Canada, *Trucking in Canada 1990–1999*, Ottawa, February 2001, (Cat. No. 53-222).
Data for 2000 estimated by Natural Resources Canada.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **734.7** | **752.9** | **805.1** | **839.3** | **876.3** | **985.5** | **34.1%** |
| 185.3 | 195.2 | 206.9 | 224.5 | 240.6 | 246.6 | 34.9% |
| 18.1 | 17.6 | 15.7 | 14.7 | 12.3 | 8 | -59.8% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0% |
| 474.7 | 485 | 525.7 | 525.2 | 557.4 | 583 | 41.4% |
| 56.6 | 54.9 | 56.7 | 74.8 | 65.9 | 67.8 | 12.8% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 136.4 | 141.9 | 148.2 | 161.4 | 165.6 | 163.8 | 21.4% |
| 119.8 | 126 | 135 | 136.6 | 149.7 | 158.1 | 56.1% |
| 298.3 | 308.5 | 344 | 347.8 | 371 | 389 | 56.7% |
| 78.5 | 76.6 | 77.9 | 74.4 | 78.6 | 80.5 | -4.6% |
| 101.7 | 99.9 | 100.1 | 119.2 | 111.5 | 114 | 7.0% |
| **610,109** | **625,689** | **667,174** | **672,525** | **719,953** | **741,188** | **37.1%** |
| 13,321 | 13,813 | 14,309 | 15,447 | 15,789 | 15,627 | 17.7% |
| 16,886 | 17,883 | 19,287 | 19,607 | 21,532 | 22,829 | 69.5% |
| 110,000 | 120,000 | 130,141 | 137,552 | 158,104 | 164,720 | 111.7% |
| 280,474 | 282,482 | 306,943 | 299,508 | 317,146 | 325,049 | 30.9% |
| 189,428 | 191,511 | 196,494 | 200,411 | 207,382 | 212,963 | 13.5% |
| **1.20** | **1.20** | **1.21** | **1.25** | **1.22** | **1.22** | **-2.4%** |

## Freight Transportation GHG Emissions by Fuel Type and Transportation Mode

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Freight Transportation GHG Emissions (Mt)** [a,d,i,k] | 49.4 | 47.9 | 48.7 | 49 | 52.1 |
| ***GHG Emissions by Fuel Type (Mt)*** [a,d,i,k] | | | | | |
| Motor Gasoline | 13.2 | 13.3 | 13.6 | 13.7 | 13.7 |
| Propane | 1.2 | 1.2 | 1.4 | 1 | 0.9 |
| Natural Gas | 0 | 0 | 0 | 0 | 0 |
| Diesel Fuel Oil | 30.4 | 28.5 | 28.7 | 30.1 | 33 |
| Heavy Fuel Oil | 4.5 | 5 | 4.9 | 4.2 | 4.5 |
| Light Fuel Oil and Kerosene | 0 | 0 | 0 | 0 | 0 |
| Coal | 0 | 0 | 0 | 0 | 0 |
| ***GHG Emissions by Transportation Mode (Mt)*** [a,c,d,i,k] | | | | | |
| Light Trucks | 9.5 | 9.8 | 10.2 | 9.9 | 9.7 |
| Medium Trucks | 7.3 | 7.1 | 7.5 | 7.8 | 8.3 |
| Heavy Trucks | 17.7 | 16.3 | 16 | 17.3 | 19.3 |
| Rail | 6.7 | 6.3 | 6.6 | 6.6 | 6.9 |
| Marine | 8.1 | 8.4 | 8.4 | 7.4 | 7.9 |
| **GHG Intensity (tonne/TJ)** [d,k] | 73.1 | 73.1 | 73 | 73.1 | 73.1 |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

c) Statistics Canada, *Rail in Canada 1990–1999*, Ottawa, July 1992–April 2000, (Cat. No. 52-216).
Data for 2000 estimated by Natural Resources Canada.

d) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.

i) Transport Canada, Surface and Marine Statistics and Forecasts Division, December 1999.
Data for 2000 estimated by Natural Resources Canada.

k) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **53.6** | **54.8** | **56.6** | **61.2** | **64** | **66.1** | **35.9%** |
| 13.4 | 14.1 | 15 | 16.1 | 17.3 | 17.7 | 34.1% |
| 1.1 | 1.1 | 0.9 | 0.9 | 0.7 | 0.5 | -58.3% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 34.8 | 35.5 | 38.4 | 38.8 | 41.1 | 43 | 41.4% |
| 4.2 | 4.1 | 4.2 | 5.5 | 4.8 | 5 | 11.1% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 9.6 | 10 | 10.5 | 11.4 | 11.7 | 11.6 | 22.1% |
| 8.6 | 9.1 | 9.7 | 9.8 | 10.8 | 11.4 | 56.2% |
| 21.3 | 22 | 24.5 | 25 | 26.7 | 28 | 58.2% |
| 6.2 | 6.1 | 6.2 | 6 | 6.3 | 6.5 | -3.0% |
| 7.8 | 7.6 | 7.7 | 9 | 8.5 | 8.6 | 6.2% |
| **72.9** | **72.8** | **72.8** | **73** | **73** | **73** | **-0.1%** |

## Passenger and Freight Road Transportation Energy Use and GHG Emissions by Fuel Type

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Passenger Road Transportation Energy Use (PJ) [d]** | **908.5** | **924.1** | **948.3** | **974.8** | **1,018.4** |
| ***Energy Use by Fuel Type (PJ) [d]*** | | | | | |
| Motor Gasoline | 884.0 | 849.6 | 866.9 | 895.0 | 929.9 |
| Propane | 15.5 | 16.7 | 18.5 | 14.6 | 13.8 |
| Natural Gas | 1.6 | 2 | 2.2 | 2.3 | 2.4 |
| Diesel Fuel Oil | 52.3 | 52.8 | 58.7 | 60 | 67.3 |
| Electricity | 3.1 | 3.1 | 2.9 | 2.9 | 2.9 |
| **Activity** | | | | | |
| Passenger-Kilometres (million) [d] | 439,942 | 434,408 | 453,012 | 459,196 | 480,087 |
| **Energy Intensity (MJ/passenger-kilometre) [d]** | **2.17** | **2.13** | **2.10** | **2.12** | **2.12** |
| **Passenger Road Transportation GHG Emissions (Mt) [d,k]** | **67.9** | **65.6** | **67.4** | **69.2** | **72.2** |
| ***GHG Emissions by Fuel Type (Mt) [d,k]*** | | | | | |
| Motor Gasoline | 63 | 60.5 | 61.8 | 63.8 | 66.3 |
| Propane | 0.9 | 1 | 1.1 | 0.9 | 0.8 |
| Natural Gas | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Diesel Fuel Oil | 3.7 | 3.8 | 4.2 | 4.3 | 4.8 |
| Electricity | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 |
| **GHG Intensity (tonne/TJ) [d,k]** | **71** | **70.9** | **71** | **71** | **71.1** |
| **Freight Road Transportation Energy Use (PJ) [d]** | **484.4** | **485.8** | **473.1** | **498.1** | **523.3** |
| ***Energy Use by Fuel Type (PJ) [d]*** | | | | | |
| Motor Gasoline | 182.8 | 183.2 | 187.3 | 188.5 | 188.9 |
| Propane | 19.9 | 20.1 | 24 | 17 | 15.9 |
| Natural Gas | 0 | 0 | 0 | 0 | 0 |
| Diesel Fuel Oil | 281.7 | 282.4 | 261.7 | 284.5 | 318.3 |
| **Activity** | | | | | |
| Tonne-Kilometres (million) [d] | 104,549 | 97,636 | 101,287 | 113,351 | 131,552 |
| **Energy Intensity (MJ/tonne-kilometre) [d]** | **4.63** | **4.77** | **4.67** | **4.32** | **3.98** |
| **Freight Road Transportation GHG Emissions (Mt) [d,k]** | **34.5** | **33.2** | **33.7** | **35** | **37.3** |
| ***GHG Emissions by Fuel Type (Mt) [d,k]*** | | | | | |
| Motor Gasoline | 13.2 | 13.3 | 13.6 | 13.7 | 13.7 |
| Propane | 1.2 | 1.2 | 1.4 | 1 | 0.9 |
| Natural Gas | 0 | 0 | 0 | 0 | 0 |
| Diesel Fuel Oil | 20.1 | 18.7 | 18.7 | 20.3 | 22.7 |
| **GHG Intensity (tonne/TJ) [d,k]** | **71.2** | **71.2** | **71.1** | **71.3** | **71.3** |

**Sources:**

d) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.

k) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| 1996 | 1998 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| 1,918.8 | 1,914.4 | 1,929.2 | 1,956.2 | 1,991.1 | 1,992.3 | 10.6% |
| | | | | | | |
| 926.9 | 927.6 | 939.3 | 966.8 | 977.3 | 966.1 | 9.3% |
| 14.7 | 13.2 | 12.6 | 12.3 | 10.3 | 7.9 | -49.0% |
| 2.3 | 2.1 | 2.5 | 2.5 | 2.2 | 2.3 | 43.8% |
| 71.3 | 68.4 | 70.9 | 71.8 | 68.3 | 72.8 | 39.2% |
| 3 | 3 | 3 | 2.9 | 3 | 3.1 | 0.0% |
| | | | | | | |
| 473,589 | 474,319 | 477,583 | 486,097 | 483,902 | 481,954 | 9.5% |
| 2.15 | 2.14 | 2.15 | 2.17 | 2.19 | 2.18 | 8.9% |
| | | | | | | |
| 72.4 | 72.2 | 73.2 | 74.8 | 76 | 74.4 | 9.8% |
| | | | | | | |
| 66.2 | 66.2 | 67.1 | 68.4 | 69.2 | 68.4 | 9.6% |
| 0.9 | 0.8 | 0.7 | 0.7 | 0.6 | 0.5 | -44.4% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0% |
| 5.1 | 4.9 | 5.1 | 5.2 | 4.9 | 5.2 | 40.5% |
| 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.0% |
| 71.1 | 71.1 | 71.2 | 78.7 | 78.7 | 78.7 | -8.4% |
| | | | | | | |
| 564.5 | 576.3 | 627.1 | 646.7 | 666.2 | 711 | 46.8% |
| | | | | | | |
| 185.3 | 195.2 | 206.9 | 224.5 | 240.6 | 246.6 | 34.9% |
| 18.1 | 17.6 | 15.7 | 14.7 | 12.3 | 8 | -59.8% |
| 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| 351 | 363.4 | 404.4 | 406.5 | 433.2 | 456.3 | 62.0% |
| | | | | | | |
| 140,207 | 151,696 | 163,737 | 172,606 | 195,425 | 203,176 | 94.3% |
| 3.86 | 3.8 | 3.83 | 3.74 | 3.51 | 3.6 | -24.4% |
| | | | | | | |
| 39.5 | 41.1 | 44.8 | 46.3 | 49.2 | 81 | 47.8% |
| | | | | | | |
| 13.4 | 14.1 | 15 | 16.1 | 17.3 | 17.7 | 34.1% |
| 1.1 | 1.1 | 0.9 | 0.9 | 0.7 | 0.5 | -58.3% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| 25 | 25.9 | 28.8 | 29.3 | 31.2 | 32.9 | 63.7% |
| 71.3 | 71.3 | 71.4 | 71.6 | 71.7 | 71.8 | 8.8% |

## Transportation Explanatory Variables

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Cars** | | | | | |
| ***Car Sales (thousands)*** [d] | | | | | |
| Small Cars | 584 | 530 | 497 | 461 | 463 |
| Large Cars | 300 | 343 | 301 | 278 | 285 |
| ***Car Stock (thousands)*** [d] | | | | | |
| Small Cars | 6,652 | 6,772 | 6,759 | 6,802 | 6,759 |
| Large Cars | 4,449 | 4,450 | 4,340 | 4,323 | 4,270 |
| ***Average Car Distance Travelled Per Year (km)*** [d] | | | | | |
| Small Cars | 16,215 | 16,035 | 15,921 | 15,714 | 15,567 |
| Large Cars | 15,875 | 15,786 | 15,788 | 15,575 | 15,452 |
| ***Average Small Car Fuel Consumption (L/100 km)*** [d] | | | | | |
| Motor Gasoline | 9.4 | 9.1 | 9.4 | 9.6 | 9.8 |
| ***Average Large Car Fuel Consumption (L/100 km)*** [d] | | | | | |
| Motor Gasoline | 13.2 | 12.6 | 12.6 | 12.7 | 12.9 |
| **Motorcycles** | | | | | |
| ***Motorcycle Stock (thousands)*** [l] | 285 | 278 | 269 | 268 | 264 |
| ***Average Motorcycle Distance Travelled Per Year (km)*** [d] | 3,661 | 3,553 | 3,893 | 4,165 | 4,646 |
| ***Average Motorcycle Fuel Consumption (L/100 km)*** [d] | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| **Buses** | | | | | |
| ***Bus Stock (thousands)*** [d] | | | | | |
| School Bus | 36 | 36 | 36 | 36 | 40 |
| Urban Transit | 40 | 40 | 41 | 42 | 42 |
| Inter-City Bus | 5 | 5 | 5 | 4 | 5 |
| ***Average Bus Distance Travelled Per Year (km)*** [b,d] | | | | | |
| School Bus | 17,094 | 19,612 | 20,752 | 17,101 | 23,114 |
| Urban Transit | 43,625 | 41,817 | 44,218 | 46,192 | 50,048 |
| Inter-City Bus | 106,708 | 98,059 | 96,282 | 108,337 | 124,114 |

**Sources:**

b) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1999*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).

d) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.

j) Statistics Canada, *Trucking in Canada 1990–1999*, Ottawa, February 2001, (Cat. No. 53-222). Data for 2000 estimated by Natural Resources Canada.

l) Statistics Canada, *Road Motor Vehicles Registrations 1976–1998*, (Cat. No. 53-219).
Statistics Canada, *Cansim II*, Statistics Canada's online statistical database, table 405–4004, 1999–2000.

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990-2000 |
|---|---|---|---|---|---|---|
| 409 | 417 | 466 | 468 | 508 | 534 | -8.6% |
| 261 | 243 | 272 | 273 | 299 | 315 | 4.8% |
| 6,726 | 6,621 | 6,625 | 6,462 | 6,473 | 6,425 | -3.4% |
| 4,210 | 4,131 | 4,115 | 4,002 | 3,991 | 3,938 | -11.5% |
| 15,393 | 15,244 | 15,131 | 15,134 | 15,114 | 15,138 | -8.6% |
| 15,354 | 15,161 | 15,012 | 15,004 | 14,982 | 15,012 | -5.4% |
| 9.7 | 9.8 | 9.8 | 9.9 | 9.8 | 9.5 | 1.1% |
| 12.6 | 12.6 | 12.5 | 12.6 | 12.4 | 12.1 | -8.3% |
| 258 | 253 | 259 | 271 | 274 | 311 | 9.2% |
| 4,283 | 4,496 | 4,535 | 4,638 | 4,662 | 4,622 | 26.2% |
| 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 0.0% |
| 40 | 40 | 40 | 42 | 39 | 40 | 11.1% |
| 43 | 43 | 43 | 44 | 41 | 43 | 8.9% |
| 4 | 4 | 4 | 4 | 4 | 4 | -12.5% |
| 22,977 | 21,431 | 23,108 | 24,062 | 24,457 | 23,528 | 37.6% |
| 51,326 | 50,433 | 53,042 | 49,763 | 50,617 | 49,698 | 13.9% |
| 126,861 | 127,319 | 121,597 | 122,588 | 126,370 | 121,602 | 14.0% |

*continued*

## Transportation Explanatory Variables *continued*

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Trucks** | | | | | |
| ***Truck Sales (thousands)*** [d] | | | | | |
| Light Trucks | 388 | 377 | 348 | 365 | 400 |
| Medium Trucks | 44 | 37 | 58 | 66 | 74 |
| Heavy Trucks | 15 | 9 | 12 | 19 | 24 |
| ***Truck Stock (thousands)*** [d,j] | | | | | |
| Light Trucks | 3,444 | 3,494 | 3,623 | 3,923 | 4,186 |
| Medium Trucks | 619 | 625 | 640 | 645 | 650 |
| Heavy Trucks | 257 | 256 | 259 | 258 | 260 |
| ***Average Truck Distance Travelled Per Year (km)*** [d,j] | | | | | |
| Light Trucks | 19,004 | 18,936 | 18,863 | 18,326 | 17,949 |
| Medium Trucks | 18,953 | 18,776 | 18,837 | 18,927 | 19,216 |
| Heavy Trucks | 74,023 | 70,767 | 67,652 | 67,105 | 68,498 |
| ***Average Light Truck Fuel Consumption (L/100 km)*** [d] | | | | | |
| Motor Gasoline | 15.4 | 15.1 | 15 | 15 | 15 |
| Diesel Fuel Oil | 16.9 | 16.1 | 15.8 | 15.6 | 15.5 |
| ***Average Medium Truck Fuel Consumption (L/100 km)*** [d] | | | | | |
| Motor Gasoline | 28.1 | 27.9 | 27.6 | 27.3 | 26.9 |
| Diesel Fuel Oil | 23.5 | 23.3 | 23.1 | 22.9 | 22.6 |
| ***Average Large Truck Fuel Consumption (L/100 km)*** [d] | | | | | |
| Diesel Fuel Oil | 46.8 | 46.6 | 46.4 | 46.1 | 45.6 |

**Sources:**

b) Statistics Canada, *Passenger Bus and Urban Transit Statistics 1990–1999*, February 1993–December 1999, (Cat. No. 53-215). Data for 1999 estimated by Natural Resources Canada.
Statistics Canada, *Canadian Vehicle Survey 2000*, June 2001, (Cat. No. 53F0004XIE).

d) Natural Resources Canada, Transportation Energy Demand Model, Ottawa, February 2002.

j) Statistics Canada, *Trucking in Canada 1990–1999*, Ottawa, February 2001, (Cat. No. 53-222).
Data for 2000 estimated by Natural Resources Canada.

l) Statistics Canada, *Road Motor Vehicles Registrations 1976–1998*, (Cat. No. 53-219).
Statistics Canada, *Cansim II*, Statistics Canada's online statistical database, table 405–4004, 1999–2000.

| 1996 | 1998 | 1997 | 1998 | 1999 | 2000 | continued<br>Total Growth 1990-2000 |
|---|---|---|---|---|---|---|
| 372 | 426 | 549 | 563 | 572 | 585 | 50.8% |
| 79 | 85 | 88 | 102 | 116 | 114 | 158.2% |
| 25 | 22 | 28 | 28 | 33 | 29 | 98.2% |
| 4,476 | 4,730 | 4,984 | 5,422 | 5,636 | 5,779 | 67.8% |
| 657 | 692 | 726 | 722 | 803 | 839 | 35.5% |
| 266 | 284 | 303 | 304 | 330 | 329 | 27.9% |
| 17,453 | 17,141 | 17,183 | 17,013 | 17,085 | 17,150 | -9.6% |
| 19,676 | 19,916 | 20,135 | 20,737 | 20,620 | 20,864 | 10.1% |
| 71,311 | 71,326 | 72,516 | 75,429 | 76,199 | 78,036 | 5.4% |
| 15.2 | 15.2 | 15.3 | 15.4 | 15.5 | 15.5 | 0.6% |
| 15.5 | 15.6 | 15.5 | 15.5 | 15.5 | 15.6 | -7.7% |
| 26.6 | 26.3 | 26.1 | 25.8 | 25.7 | 25.6 | -8.9% |
| 22.4 | 22.2 | 22.1 | 21.9 | 21.8 | 21.7 | -7.7% |
| 45.1 | 44.7 | 44.1 | 43.3 | 42.8 | 42.2 | -9.8% |

# Chapter 6 Agriculture Sector

## The Data Situation

The energy use data used in this sector come from Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada* (QRESD) (Cat. No. 57-003). Informetrica Limited provided the gross domestic product (GDP) data.

The *Farm Energy Use Survey*, conducted in 1997 by Statistics Canada, also provides aggregate energy use data. Prior to this survey, however, a 16-year gap existed because Statistics Canada had conducted its previous survey of farm energy use in Canada in 1981. As a result, Natural Resources Canada, along with Agriculture and Agri-Food Canada and Environment Canada, co-sponsored the 1997 *Farm Energy Use Survey*.

Information on the energy-using activities on Canadian farms is available only at an aggregate level. The agricultural GDP reported by Statistics Canada incorporates all agricultural activities, including both livestock and field crop productions, in its measure.

## Agriculture Energy Use and GHG Emissions by Fuel Type and End-Use

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| **Total Energy Use (PJ)** [a] | **199.2** | **195.2** | **196.9** | **198.8** | **195.8** |
| ***Energy Use by End-Use (PJ)*** [a] | | | | | |
| Non-Motive Energy Use | 71.6 | 79.7 | 87.6 | 86.3 | 77.9 |
| Motive Energy Use | 127.6 | 115.6 | 109.2 | 112.5 | 117.9 |
| ***Energy Use by Fuel Type (PJ)*** [a] | | | | | |
| Natural Gas | 23.2 | 23.3 | 25.1 | 31.2 | 23.6 |
| Propane | 5 | 5.3 | 9 | 6.7 | 6.5 |
| Kerosene | 1 | 1.7 | 2.5 | 1.6 | 1.5 |
| Light Fuel Oil | 10.8 | 14.7 | 16.6 | 11.9 | 10.8 |
| Heavy Fuel Oil | 0.6 | 0.6 | 0.7 | 0.8 | 0.8 |
| Motor Gasoline | 56.1 | 48.4 | 40.7 | 35.9 | 33.4 |
| Diesel Fuel Oil | 71.5 | 67.2 | 68.5 | 76.6 | 84.5 |
| Electricity | 31.1 | 34 | 33.7 | 33.9 | 34.5 |
| Steam | 0 | 0.2 | 0.1 | 0.2 | 0.1 |
| **Activity** | | | | | |
| GDP (million $86) [b] | 10,838 | 10,712 | 10,030 | 10,726 | 11,195 |
| **Energy Intensity (MJ/$86)** [a,b] | **18.4** | **18.2** | **19.6** | **18.5** | **17.5** |
| **Total GHG Emissions Including Electricity (Mt)** [a,c] | **13.7** | **13.3** | **13.6** | **13.3** | **13.3** |
| ***GHG Emissions by End-Use (Mt)*** [a,c] | | | | | |
| Non-Motive GHG Emissions | 4.1 | 4.6 | 5.3 | 4.7 | 4.2 |
| Motive GHG Emissions | 9.6 | 8.7 | 8.3 | 8.6 | 9.1 |
| ***GHG Emissions by Fuel Type (Mt)*** [a,c] | | | | | |
| Natural Gas | 1.2 | 1.2 | 1.3 | 1.6 | 1.2 |
| Propane | 0.3 | 0.3 | 0.5 | 0.4 | 0.4 |
| Kerosene | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 |
| Light Fuel Oil | 0.8 | 1.1 | 1.2 | 0.9 | 0.8 |
| Heavy Fuel Oil | 0 | 0 | 0.1 | 0.1 | 0.1 |
| Motor Gasoline | 3.9 | 3.4 | 2.9 | 2.5 | 2.3 |
| Diesel Fuel Oil | 5.7 | 5.3 | 5.4 | 6.1 | 6.7 |
| Electricity | 1.7 | 1.8 | 2 | 1.7 | 1.7 |
| Steam | 0 | 0 | 0 | 0 | 0 |
| **GHG Intensity (tonne/TJ)** [a,c] | **68.9** | **68.1** | **69** | **66.9** | **67.7** |
| **Total GHG Emissions Excluding Electricity (Mt)** [a,c] | **12** | **11.5** | **11.5** | **11.6** | **11.6** |
| ***GHG Emissions by End-Use (Mt)*** [a,c] | | | | | |
| Non-Motive GHG Emissions | 2.4 | 2.7 | 3.2 | 3 | 2.5 |
| Motive GHG Emissions | 9.6 | 8.7 | 8.3 | 8.6 | 9.1 |
| **GHG Intensity (tonne/TJ)** [a,c] | **58.2** | **58.7** | **58.7** | **58.4** | **59.1** |

**Sources:**

a) Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1990–1998 revisions*, Ottawa, January 2001, (CANSIM).
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada, 1999–2000 revisions*, Ottawa, February 2002.

b) Informetrica Limited, *TIM/RIM Database and National Reference Forecast*, Ottawa, November 2001.

c) GHG emissions factors from Environment Canada, *Canada's Greenhouse Gas Inventory 1990–1999*, Ottawa, April 2001, (Cat. No. EN49-5/5-9-1-1999E).

| 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Total Growth 1990–2000 |
|---|---|---|---|---|---|---|
| **209.2** | **222.9** | **230** | **224.7** | **229.9** | **231.9** | **10.4%** |
| | | | | | | |
| 80.2 | 84.6 | 84.7 | 78.4 | 79.9 | 78.3 | 9.4% |
| 129 | 138.3 | 145.3 | 146.3 | 150 | 153.6 | 20.4% |
| | | | | | | |
| 22.9 | 26.9 | 26.3 | 23.7 | 24.1 | 27.3 | 17.7% |
| 7.4 | 6.4 | 7 | 4.9 | 5.4 | 5.4 | 8.0% |
| 1.5 | 1.7 | 1.5 | 1.2 | 1.1 | 0.6 | -40.0% |
| 14 | 13.8 | 13.8 | 13 | 13.5 | 9.5 | -12.0% |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.5 | 1 | 66.7% |
| 40.4 | 43.7 | 44.9 | 46.4 | 47.3 | 46.8 | -16.6% |
| 88.7 | 94.6 | 100.5 | 99.9 | 102.7 | 106.8 | 49.4% |
| 33.8 | 35.4 | 35.7 | 35.1 | 35.2 | 34.6 | 11.3% |
| 0.1 | 0.1 | 0 | 0.1 | 0.1 | 0 | – |
| | | | | | | |
| 11,441 | 11,878 | 11,318 | 11,947 | 12,922 | 12,511 | 15.4% |
| **16.3** | **16.8** | **26.3** | **16.8** | **17.8** | **16.5** | **6.9%** |
| | | | | | | |
| **14.4** | **15.2** | **15.9** | **15.9** | **16.2** | **16.4** | **16.7%** |
| | | | | | | |
| 4.5 | 4.6 | 4.8 | 4.7 | 4.7 | 4.6 | 12.2% |
| 9.9 | 10.6 | 11.1 | 11.2 | 11.5 | 11.8 | 22.9% |
| | | | | | | |
| 1.1 | 1.3 | 1.3 | 1.2 | 1.2 | 1.4 | 16.7% |
| 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.0% |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0 | – |
| 1 | 1 | 1 | 0.9 | 1 | 0.7 | -12.5% |
| 0 | 0 | 0 | 0 | 0 | 0.1 | – |
| 2.8 | 3.1 | 3.1 | 3.2 | 3.3 | 3.3 | -15.4% |
| 7 | 7.5 | 8 | 8 | 8.2 | 8.6 | 50.9% |
| 1.7 | 1.7 | 1.9 | 2.2 | 2.1 | 2.1 | 23.5% |
| 0 | 0 | 0 | 0 | 0 | 0 | – |
| **68.8** | **68.2** | **69.3** | **70.9** | **70.8** | **70.7** | **2.6%** |
| | | | | | | |
| **12.6** | **13.5** | **14** | **13.8** | **14.2** | **14.3** | **19.2%** |
| | | | | | | |
| 2.8 | 2.9 | 2.9 | 2.5 | 2.6 | 2.5 | 4.2% |
| 9.9 | 10.6 | 11.1 | 11.2 | 11.5 | 11.8 | 22.9% |
| **60.4** | **60.5** | **60.9** | **61.3** | **61.6** | **61.7** | **2.5%** |

# Appendix A Reconciliation of Data

## Reconciliation of Data on Energy Use Found in This Report With Data in Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada* — 2000

| | Revised QRESD data | Fuel Wood | Commercial & Public Admin. Diesel | Commercial & Public Admin. Aviation Fuels |
|---|---|---|---|---|
| ***Sector*** | | | | |
| **Residential** | 1,288 | 100 | | |
| **Commercial/Institutional** | 1,294 | | (141) | (29) |
| **Industrial** | 2,262 | | | |
| **Transportation** | 2,280 | | 141 | 29 |
| **Agriculture** | 232 | | | |
| ***Final Demand*** | ***7,376*** | ***100*** | ***0*** | ***0*** |
| Non Energy | 789 | | | |
| Producer Consumption | 1,259 | | | |
| ***Net Supply*** | ***9,423*** | ***100*** | ***0*** | ***0*** |
| Conversion losses * | 1,696 | | | |
| ***Total primary*** | ***11,119*** | ***100*** | ***0*** | ***0*** |

**Notes on sources of energy use data for five end-use sectors:**

**Residential:** Base data taken from revised QRESD (Table 1B, line 44) plus fuel wood use (estimated from NRCan's Residential End-use Model).

**Commercial/Institutional:** Base data taken from revised QRESD (line 45 plus line 46) less commercial and public administration motor gasoline (Table 1D, motor gasoline column, line 45 plus line 46) less commercial and public administration diesel (Table 1D, diesel column, line 45 plus line 46) less commercial and public administration aviation gasoline (Table 1D, aviation gasoline column, line 45 plus line 46) less commercial and public administration aviation turbo fuel (Table 1D, aviation turbo fuel column, line 45 plus line 46).

**Industrial:** Base data taken from revised QRESD (Table 1B, line 31) plus solid wood waste and pulping liquor (Table 20) plus producer consumption by refinery and mining industries of still gas, diesel, heavy fuel oil, light fuel oil, kerosene, petroleum coke and refinery LPG (Table 1D, still gas, diesel, heavy fuel oil, light fuel oil, kerosene, petroleum coke and refinery LPG columns, line 16) plus waste fuels (Canadian Industrial Energy End-Use Data and Analysis Center).

**Transportation:** Base data taken from revised QRESD (Table 1B, line 42) less pipeline fuels (Table 1B, line 39) plus commercial and public administration motor gasoline (Table 1D, motor gasoline column, line 45 plus line 46) plus commercial diesel (Table 1D, diesel column, line 45 plus line 46) plus commercial and public administration aviation gasoline (Table 1D, aviation gasoline column, line 45 plus line 46) plus commercial and public administration aviation turbo fuel (Table 1D, aviation turbo fuel column, line 45 plus line 46).

**Agriculture:** Base data taken from revised QRESD (Table 1B, line 43).

* Electricity conversion rates: Hydro-electricity converted at a rate of 3.6 megajoules per kilowatt-hour; nuclear electricity converted at a rate of 11.584 megajoules per kilowatt-hour.

| Commercial & Public Admin. Motor Gasoline | Pipeline Fuels | Wood Waste & Pulping Liquor | Waste Fuels Used in Cement Industry | Re-allocation of Producer Consumption by Refining and Mining Industries | Data Presented in this Report |
|---|---|---|---|---|---|
| | | | | | 1,388 |
| (65) | | | | | 1,059 |
| | | 531 | 6 | 384 | 3,264 |
| 65 | (233) | | | | 2,282 |
| | | | | | 232 |
| *0* | *(233)* | *531* | *6* | *384* | *8,184* |
| | | | | | 789 |
| | 233 | | | (384) | 1,107 |
| *0* | *0* | *531* | *6* | *0* | *10,080* |
| | | | | | 1,696 |
| *0* | *0* | *531* | *6* | *0* | *11,756* |

# *Appendix B* Reconciliation of Definition

## Reconciliation of Definition of Estimated Greenhouse Gas Emissions Found in This Report With Environment Canada's *Canada's Greenhouse Gas Inventory: 1990–1999*

### Introduction

In this report, the data on greenhouse gases, particularly the data on carbon dioxide emissions, are estimated using emissions factors developed by Environment Canada (EC). The emissions estimates provided herein mirror the sectoral definitions used to calculate the estimates presented in *Canada's Greenhouse Gas Inventory: 1990–1999* (CGGI-1999). Both Natural Resources Canada (NRCan) and EC use the energy demand data from Statistics Canada's *Quarterly Report on Energy Supply-Demand in Canada* (QRESD) as a base. However, the two organizations use different sectoral mappings. EC prepares its emissions inventory according to the specifications of the Intergovernmental Panel on Climate Change. NRCan, meanwhile, has developed a mapping that is most suited to energy end-use analysis.

The objective of this appendix is to help you understand the similarities and differences between CGGI-1999 and NRCan sectoral emissions estimates for the five end-use sectors covered in this report.

## Residential Sector

NRCan and CGGI-1999 differ in their definitions of residential emissions.

- First, NRCan residential emissions include end-use electricity-related emissions, which are reported under power generation in CGGI-1999.
- Second, the wood energy use differs (EC's estimate is larger than NRCan's). Hence the GHG emissions related to wood energy use that are presented here are smaller than those in CGGI-1999.

## Commercial/Institutional Sector

There is only one difference between the NRCan and CGGI-1999 definitions of commercial/institutional emissions.

- NRCan commercial emissions include end-use electricity-related emissions, which CGGI-1999 includes under power generation.

## Industrial Sector

The industrial sector contains many differences between the definitions described in CGGI-1999 and in this report.

- First, CGGI-1999 reallocates industrial diesel fuel use from the industrial sector to the transportation sector.
- Second, this report reallocates producer consumption of petroleum products by the petroleum refining and upstream mining industry from the producer consumption sector to petroleum refining and upstream mining within the industrial sector. CGGI-1999 reports this consumption under fossil fuels.
- Third, CGGI-1999 reallocates industrial coke use from energy use in the industrial sector to non-energy use in industrial processes.
- Fourth, NRCan industrial emissions include end-use electricity-related emissions. CGGI-1999 reports them under power generation.
- Fifth, CGGI-1999 includes producers' consumption of non-fossil fuels in the fossil fuel categories. NRCan does not report this consumption. CGGI-1999 also reallocates estimates of emissions from upstream oil and gas flaring to the fugitive emissions from the fossil fuel sector.

## Transportation Sector

Differences to the boundary of the transportation sector relate to CGGI-1999 reallocating or excluding QRESD data from its inventory, while NRCan allocates end-use electricity-related emissions to the end-use sectors.

- First, CGGI-1999 reallocates industrial diesel, farm diesel and motor gasoline to the transportation sector
- Second, EC's inventory excludes emissions resulting from the use of energy in the foreign aviation sub-sectors.
- Third, NRCan transportation emissions include end-use electricity-related emissions, which are reported under power generation in CGGI-1999.

## Agriculture Sector

There are differences in the agriculture sector.

- CGGI-1999 reclassifies all farm diesel and motor gasoline in the transportation sector, while NRCan leaves this consumption in agriculture (as does the QRESD).
- NRCan includes end-use electricity-related emissions in agriculture, while CGGI-1999 reports them under power generation.

# Appendix C Glossary of Terms

**Activity:** Term used to characterize major drivers of energy use in a sector (e.g., number of households in the residential sector).

**Apartment:** This type of dwelling includes dwelling units in apartment blocks or apartment hotels; flats in duplexes or triplexes (i.e., where the division between dwelling units is horizontal); suites in structurally converted houses; living quarters located above or in the rear of stores, restaurants, garages or other business premises; janitors' quarters in schools, churches, warehouses, etc.; and private quarters for employees in hospitals or other types of institutions.

**Appliances:** Energy-consuming equipment used in the home for purposes other than air conditioning, centralized water heating and lighting. Includes cooking appliances (gas stoves, gas ovens, electric stoves, electric ovens, microwave ovens and propane or gas grills); cooling appliances (evaporative coolers, attic fans, window or ceiling fans, portable or table fans); and refrigerator, freezers, clothes washers, dishwashers, clothes dryers, outdoor gas lights, dehumidifiers, personal computers, pumps for well water, televisions, water-bed heaters, swimming pool heaters, hot tubs and spas.

**Carbon Dioxide:** A compound of carbon and oxygen formed whenever carbon is burned. Chemical formula: $CO_2$. Carbon dioxide is a colourless gas that absorbs infrared radiation, mostly at wavelengths between 12 and 18 microns. It behaves as a one-way filter, allowing incoming, visible light to pass through in one direction, while preventing outgoing infrared radiation from passing in the opposite direction. The one-way filtering effect of carbon dioxide causes an excess of the infrared radiation to be trapped in the atmosphere; thus it acts as a greenhouse and has the potential to increase the surface temperature of the planet.

**Cooling Degree-Days (CDDs):** A measure of how hot a location was over a period of time, relative to a base temperature. In this report, the base temperature is 18.0°C; the period of time is one year. The cooling degree-days for a single day is the difference between that day's average temperature and 18.0°C, if the daily average exceeds the base temperature. It is zero if the daily average is less than, or equal to, the base temperature. The cooling degree-days for a longer period of time is the sum of the daily cooling degree-days from the days in the period.

**Dwelling:** A dwelling is defined as a structurally separate set of living premises with a private entrance from outside the building or from a common hallway or stairway inside. A private dwelling is one in which one person, a family or other small group of individuals may reside, such as a single house, apartment, etc.

**End-Use:** Any specific activity that requires energy (e.g., refrigeration, space heating, water heating, manufacturing process, feedstock).

**Energy Intensity:** The amount of energy use per unit of activity (examples of activity measures in this report are households, floor space, passenger-kilometres, tonne-kilometres, physical units of production or constant dollar value of gross domestic product by industry).

**Energy Source:** Any substance that supplies heat or power (e.g., petroleum, natural gas, coal, renewable energy and electricity), including the use of a fuel as a non-energy feedstock).

**Floor Area (space):** The area enclosed by exterior walls of a building. In the residential sector, it excludes parking areas, basements or other floors below ground level, while they are included in the commercial sector. It is measured in square metres.

**Fossil Fuel:** Any naturally occurring organic fuel, such as petroleum, coal and natural gas.

**Furnace:** Space-heating equipment consisting of an enclosed chamber where fuel is burned or electrical resistance is used to heat air directly, without using steam or hot water. The warm air is for heating and is distributed throughout the house, typically by air ducts.

**Gigajoule (GJ):** One gigajoule equals 1 x $10^9$ joules. A joule is the international unit of measure of energy — the energy produced by a power of one watt flowing for a second. There are 3.6 million joules in one kilowatt-hour (see Kilowatt-hour).

**Greenhouse Gas (GHG):** A greenhouse gas absorbs and radiates heat in the lower atmosphere that otherwise would be lost in space. The greenhouse effect is essential for life on this planet, since it keeps average global temperatures high enough to support plant and animal growth. The main greenhouse gases are carbon dioxide ($CO_2$), methane ($CH_4$), chlorofluorocarbons (CFCs) and nitrous oxide ($N_2O$). By far the most abundant greenhouse gas is $CO_2$, accounting for 70 percent of the greenhouse gas effect (see Carbon dioxide).

**Greenhouse Gas Intensity of Energy:** The amount of greenhouse gas per unit of energy.

**Gross Domestic Product (GDP):** The total value of goods and services produced by the nation's economy before the deduction of depreciation charges and other allowances for capital consumption, labour and property located in Canada. It includes the total output of goods and services by private consumers and governments, gross private domestic capital investment and net foreign trade. GDP figures are reported in real 1986 dollars.

**Gross Output:** The total value of goods and services produced by an industry. A sum of the industry's shipments plus the change in value due to labour and capital investment.

**Gross Vehicle Weight:** The weight of the empty vehicle plus the maximum anticipated load weight.

**Heat Gains:** Heat gained by a building from the operation of appliances. These heat gains reduce the space-heating load in the winter and increase the space-cooling load in the summer.

**Heat Loss:** Represents the amount of energy released as heat by an appliance or piece of equipment while it is in operation.

**Heating Degree-Days (HDDs):** A measure of how cold a location was over a period of time relative to a base temperature. In this report, the base temperature is 18.0°C; the period of time is one year. The heating degree-days for a single day is the difference between that day's average temperature and 18.0°C, if the daily average is below the base temperature. It is zero if the daily average exceeds or equals the base temperature. The heating degree-days for a longer period of time is the sum of the daily heating degree-days for the days in that period.

**Heavy Trucks:** Trucks with a gross vehicle weight that is more than, or equal to, 14,970 kg (33,001 lb.).

**Household:** A person or a group of people occupying one dwelling unit is defined as a household. The number of households will, therefore, be equal to the number of occupied dwellings. The person or people occupying a private dwelling form a private household.

**Household Size:** The number of persons per household.

**Kilowatt-Hour (kWh):** The commercial unit of electricity energy equivalent to 1000 watt-hours. A kilowatt-hour can best be visualized as the amount of electricity consumed by ten 100-watt bulbs burning for an hour. One kilowatt-hour equals 3.6 million joules (see Watt).

**Large Cars:** Cars weighing 1,182 kg (2,601 lb.) or more.

**Light Trucks:** Trucks of up to 3,855 kg (8,500 lb.) of gross vehicle weight.

**Medium Trucks:** Trucks with a gross weight ranging from 3,856 to 14,969 kg (8,501 to 33,000 lb.).

**Megajoule (MJ):** One megajoule equals $1 \times 10^6$ joules (see Gigajoule).

**Mobile Home:** A moveable dwelling designed and constructed to be transported by road on its own chassis to a site and placed on a temporary foundation (such as blocks, posts or a prepared pad). It should be capable of being moved to a new location.

**Passenger-Kilometre:** The transport of one passenger over a distance of one kilometre.

**Penetration Rate:** The rate at which a technology infiltrated the stock of buildings (e.g., number of refrigerators per household at a specified time).

**Petajoule (PJ):** One petajoule equals $1 \times 10^{15}$ joules (see Gigajoule).

**Sector:** The broadest category for which energy consumption and intensity are considered within the Canadian economy (e.g., residential, commercial, industrial, transportation and agriculture).

**Single Attached Dwelling:** Each half of a semi-detached (double) house and each section of a row or terrace are defined as single attached dwellings. A single dwelling attached to a non-residential structure also belongs to this category.

**Single Detached Dwelling:** This type of dwelling is commonly called a single house (i.e., a house containing one dwelling unit and completely separated on all sides from any other building or structure).

**Small Cars:** Cars weighing up to 1,181 kg (2,600 lb.).

**Space Cooling:** Conditioning of room air for human comfort by a refrigeration unit (e.g., air conditioner or heat pump) or by circulating chilled water through a central- or district-cooling system.

**Space Heating:** The use of mechanical equipment to heat all or part of a building. Includes both the principal space heating and the supplementary equipment.

**Tonne-Kilometre:** The transport of one tonne over a distance of one kilometre.

**Vintage:** The year of origin or age since the construction of a unit of capital stock (e.g., a building, a car).

**Water Heater:** An automatically controlled vessel designed for heating water and storing heated water.

**Water Heating:** The use of energy to heat water for hot running water, as well as the use of energy to heat water on stoves and in auxiliary water-heating equipment for bathing, cleaning and other non-cooking applications.

**Watt (W):** A measure of power; for example, a 40-watt light bulb uses 40 watts of electricity (see Kilowatt-hour).